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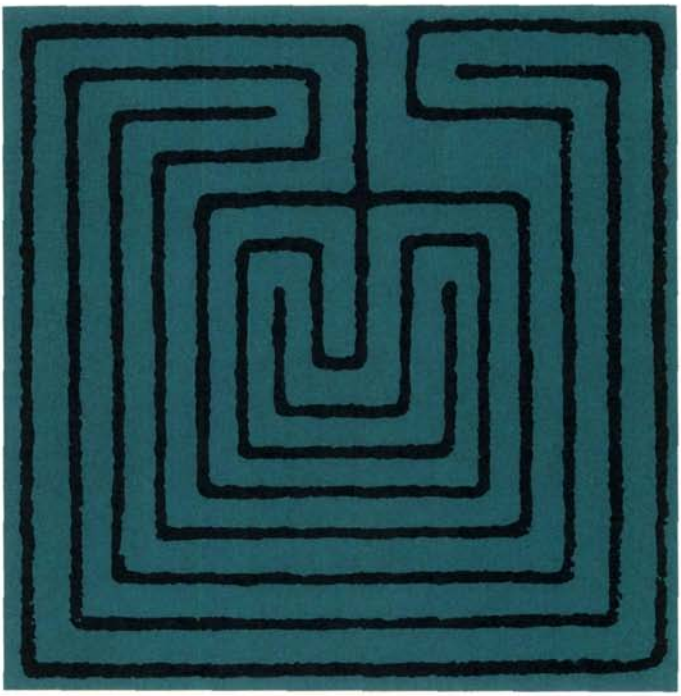

America's Doctors, Medical Science, Medical Care

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Robert J. Blendon
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Leighton E. Cluff
Kurt W. Deuschle
Robert H. Ebert
Kenneth G. Johnson
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Robert G. Petersdorf
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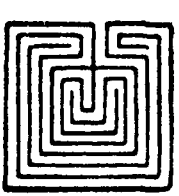
of the American Academy of Arts and Sciences



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Preface to the Issue, "America's Doctors, Medical Science, Medical Care"

THIS ISSUE OF *DAEDALUS* IS UNIQUE in several important respects; to start with, its origins are unusual. Conceived as a testimonial, a sort of *Festschrift* to honor a former Fellow of the American Academy of Arts and Sciences, Dr. Walsh McDermott, it grew quickly into a substantially more ambitious undertaking. The authors, reflecting on the life and career of their late colleague and friend, were led to ruminate on how American medicine came to be transformed in the course of the last half century, why a doctor trained in the 1930s, as McDermott was, found himself living in a professional and scientific world significantly different from the one his predecessors knew. While certain other professions—law and teaching, for example—may claim to have been no less influenced by new technology and new scholarship, by major social and economic upheaval, by great public events—none more important than the Second World War itself—neither was changed in anything like the way that medicine was. There is a good deal in this volume to support the contention that these were revolutionary decades for medicine, unlike any previously known. While the revolution may now be over, with medicine having quite new priorities and agendas, different from those of the recent "heroic age," a retrospective look at what has happened may throw into perspective the debates that are now beginning to be heard.

If the first purpose of this *Daedalus* issue is to make readers aware of the rapidity and range of the changes that occurred in American medicine and health care in the last half century, there is special significance in the fact that this tale is told primarily by those who had first-hand experience of the changes, physicians able to see the medical profession from inside. Whether they write about changes in

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student admissions to medical schools, new medical school curricula, altered hospital practices and procedures, escalating costs, the importance of vast new federal funding for both medical research and patient care, the relations that subsist between chiefs and their colleagues, or the changing nature of medical authority more generally, they do so with a refreshing candor. If these testimonies are to be believed, a sort of "golden age" existed in American medicine until very recently, when significant scientific, technological, political, administrative, and humanitarian breakthroughs occurred almost simultaneously. That age appears now to have passed. While no one wishes to announce the arrival of a "brass age" in medicine, clearly medical and health-care priorities have changed, not always to the obvious benefit of either the physician or the patient, let alone the larger society outside.

The efforts to institute controls on what are thought to be the runaway costs of a health-care system that has grown increasingly expensive, making demands on public funds substantially greater than any anticipated when Medicare and Medicaid were first introduced in the 1960s, carry political and social implications that cannot be ignored. Many of the cost-cutting methods proposed today seem almost inimical to an earlier promise of greater social justice. It is not at all apparent what the effects of these economies will be on medical research, whether a more openly and deliberately commercial medicine will indeed stimulate competition of a kind calculated to produce greater scientific advances as well as more substantial profits. There are clear advantages for some, but it is difficult to discern what social and moral values are being set aside. Not the least of the contributions of this *Daedalus* issue may be that it compels a rethinking of the political experience of the 1960s, suggesting how medicine and health care were affected by the events of that tumultuous decade.

That questions of this kind are posed by those within the medical community—that they are not simply put aside to become the subject of "muckraking" or radical journalism—testifies to the strength of a critical tradition within the medical profession itself. One wonders what a comparable *Daedalus* issue on American law and the legal profession, suggesting how they have changed over the last forty years, and written overwhelmingly by practicing lawyers and jurists, in both private and public practice, would reveal. If comparable scrutiny were made of America's law courts, law schools, and

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client-lawyer relations, if equally probing questions were asked of legal practices, we would have a way of comparing how two of the country's major professions have responded to changes in the national economy, to a federal presence almost unthinkable in the 1930s, and to a whole set of moral and ethical imperatives that were once scarcely articulated. Such a volume would communicate the atmosphere and ethos of America's law courts today, as this volume does for America's hospitals, transformed almost beyond recognition from what they were when Franklin Roosevelt came to the White House. Subtle changes in hierarchical relations within the medical profession, but also outside—changes in public expectations and attitudes—are all closely analyzed. A comparable study of American law might have asked whether any profession is likely to be transformed in the way that medicine has been, both in its human and institutional dimensions, without the stimulus of a major intellectual and technological revolution that renders a good part of yesterday's learning and experience obsolete.

To understand fully the character of this issue, to appreciate how rare it is for a profession to analyze itself, one may ask what a *Daedalus* issue, devoted to the military profession—in the language of our day, national defense—would reveal if written overwhelmingly by individuals in the armed forces, who knew the system from within, who were prepared to reflect on how specific new technologies had changed the character of the military calling and of war itself, who could be relied on to speak candidly and openly of the new relations that now subsist in the services. Close scrutiny of how recruitment and training have changed, of what new weapons have done to transform accepted military practices, of how the unprecedented costs of national defense have been justified, would tell much about contemporary American tolerances and expectations. The United States of the early New Deal years is very remote today; the idea of returning to the old order, in health or in defense, is clearly inconceivable. The *ancien régime* has vanished, almost as if it had never been. This is not to say, however, that no traces of the earlier system are discernible, or that there is no recollection of it.

A principal merit of this issue, then, is that while it seeks to be informative about medicine in the past, it avoids nostalgia and sentimentality; while it is neither negative nor fearful about the present, there is an appropriate tentativeness in predicting what the

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future may hold. If no one is prepared to argue that hospitals are likely to go the way of America's nineteenth-century smokestack industries, all recognize that the medicine and health care familiar to those alive in the 1960s are not likely to exist in those forms in the year 2000. If ambulatory care and self-care continue to grow at anything like their present rate, if the private physician, as he was once known, becomes a virtually extinct species, the medical profession will change, dramatically. This, independent of major new breakthroughs in medical science and technology and in the treatment of disease, or in the introduction of new types of surgery, carries the promise of greater longevity and better health for substantial numbers. It does not necessarily carry an equivalent promise for those who remain economically disadvantaged. Nor does it guarantee that we will speak less frequently with "forked tongues" about health and illness in the twenty-first century than we have in the twentieth.

However invaluable this volume is for revealing the "human face" of American medicine, for showing medicine as it was and as it is today, the reticences and silences of the issue ought to be acknowledged. Health, in this country, to an extent that is not always appreciated, is perhaps the greatest single good that is sought. No other age has expected so much of its medical services, or been so ready to honor its practitioners for their achievements, to pay so handsomely for the putative and real benefits bestowed. No other has been more imaginative in suggesting what the individual can do to maintain health. These are all positive gains. Still, it must be recognized that there has also been a great unwillingness to acknowledge the limits of medicine. If, as some believe, we are living in the "year one" of the modern medical revolution, and if much greater progress lies at hand, neither is likely to extinguish entirely traditional wisdom on certain fundamental matters: suffering and death, melancholia and madness, desire and appetite. These conditions have not been rendered meaningless by new microbial discoveries or other incontestable medical advances. Yet, to treat such matters seriously is to touch sensitive political and ethical nerves; physicians, like others, are wary of doing so.

Dr. Walsh McDermott's contributions as a medical reformer—together with many others of his generation—are properly commemorated in this issue of *Daedalus*. If we are not to believe, however, that only scientific "progress" matters, that the only remaining major

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social problem is to provide adequate health care at reasonable cost, maintaining, of course, a continuing search for specific remedies to treat cancer, hypertension, and heart disease, priority needs to be given again to addressing candidly certain human conditions, unpalatable individual and communal traits. No amount of romanticizing can cause these situations to be eradicated. It is perfectly reasonable to celebrate when particular diseases are "conquered," when life is artfully and scientifically prolonged. Such celebration does not diminish the need for a continued concern with "healing" and "caring," that extends beyond the treatment of specific ailments. Perhaps, in the end, the most imperative need is to place medicine in a context that does not wildly exaggerate its social potential, that is unafraid to gaze at contemporary society objectively. A becoming modesty may be one of the more important messages that a successful tale like that of the recent medical revolution communicates. This is not a message that Walsh McDermott would have disdained.

If this *Daedalus* issue is read only as a retrospective statement on what has happened in the last fifty years, its significance will be lost. There is good reason to believe that the biological revolution, so much discussed today, will indeed have the most far-reaching consequences for medicine and health care. The laboratory successes are too important to be ignored. They must not, however, be seen as existing independently of a social order that incites them, sustains them, and must ultimately determine how they are used, and for whose benefit. The most difficult medical problems remain to be resolved. They are not the ones that preoccupy those who think only in terms of gross public and private dollar expenditures for health care. They have to do with how the medical "revolution" of the last half century is maintained, not only to prolong life, but to make life better. The provision of care that is both humane and reasonable, that avoids some of the more glaring inequities and injustices of the present system, has to be given high priority. Finally the morale of those in the "healing" professions needs to be be considered. Why are so many disenchanted? Would a more imaginative and articulated concern with the potentialities of medical science and medical care do anything to restore these professions in their self-esteem, so that the nations health agenda would no longer appear to be dominated by an interest in simply resolving what are incontestably complex economic problems? Would it not do much to integrate and explain how the

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mental and physical components of illness are related, what genetic and environmental factors are involved, and why the concept of a "warm and caring physician" is not simply a call for a return to a world that is lost? Would the defining of such new scientific purposes and health-care possibilities, not only for the very old or the very ill, but for the young as well, not create a substantially revised medical agenda of a kind rarely expressed or acknowledged in this flaccid, calculating, unheroic age?

Thanks are due to The Robert Wood Johnson Foundation, and particularly to its president, Dr. David E. Rogers, for alerting us to the existence of certain of these essays in a somewhat different form. Both Dr. Rogers and Dr. Eric Cassell have been very generous with their time and advice. We are grateful to the authors who responded to short deadlines, accepting with grace and humor what some may have considered to be impossible demands.

S.R.G.

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David E. Rogers

The Early Years: The Medical World in Which Walsh McDermott Trained

MEMBERS OF THE MEDICAL PROFESSION often argue about just which era in medicine was the most exciting and intellectually satisfying time to become a physician. Walsh McDermott could marshall a fairly effective argument to suggest that the ideal time to have started a career in medicine was somewhere between the late 1920s and the early 1940s—not surprisingly the start of his own. His arguments ran as follows:

First, the days of casual "trade-school medicine" were then behind us. Starting in the late 1800s, members of the American Medical Association and the leaders of medicine became progressively dissatisfied with the poor quality of medical training in the United States. The development of the Johns Hopkins School of Medicine, just before the turn of the century, with its stiff requirements for a college education as a prerequisite and its high expectations for performance, started the revolution. The Flexner report of 1910 was its culmination. As a result of its publication many substandard institutions closed, most medical schools were incorporated into a university structure, and an accrediting system was developed to assess both the performance of the school and its products. This, in turn, led to the development of a cadre of dedicated medical-science educators, who devoted their full energies to improving medical education, its scientific underpinnings, and the practice of medicine throughout the country.

Second, and building on the above, science-based medicine was coming into its own. The exciting developments of the late nineteenth

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century in bacteriology had permitted the identification of the etiologic agents which caused many of the common fatal diseases of that day. This dramatically changed how physicians thought about disease. Biochemistry was well established by then, and the sciences of physiology and pharmacology were growing and beginning to give medicine some science-based explanations of how disease altered internal homeostasis in life-threatening situations, or how therapeutic agents behaved in the body. The simple empiricism of earlier medical times was fast disappearing. The discovery in 1915 of thyroxin and its abilities to reverse the course of myxedema, the unraveling in 1919 of the basic etiology of pernicious anemia and its management with liver extract, and the landmark discovery of insulin in 1922 with the hope it offered juvenile diabetics, had all started the majestic march of science-based medicine and changed its very character.

Most powerful of all was the advent of the antimicrobial era. Starting with the development of the sulfonamids in the mid-1930s, the discovery of penicillin in 1941, and the rapid development of other antimicrobials that soon followed, medicine changed dramatically, and the nature of disease that killed young people in the developed world was profoundly altered. Walsh McDermott maintained that to have lived in medicine both before and after the development of these agents was a special privilege; it gave a physician a profound sense of wonder, coupled with pride in science and in medicine that would sustain him or her the rest of a lifetime.

Lastly, it was still a time for heroes; heroes, who often shaped the values and aspirations of young people. We had heroes in aviation, in exploration, in sports, and in science and medicine. From the late 1890s and the early 1900s, a series of giants played a powerful role in shaping medicine. William Osler, William Welch, William Halsted, Walter Cannon, and a number of other remarkable men served as role models for many hundreds of physicians who followed.

This concept of individual "heroes" and their profound importance in shaping the aspirations and life-styles of many of their juniors is hard to convey in our cynical world of today. But powerful it was, and perhaps particularly so in medicine; the diagnostic feats, the work habits or the utterings of these men (and they were *all* men) were daily recounted by those who had served under them to those whom they, in turn, were teaching. The walls in the offices of professors (or leading practitioners) were invariably adorned with

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signed photographs of those who had been their mentors, and a question about them (or even a glance in the picture's direction) would generally lead to a story that illustrated their brilliance, selflessness or dedication to medicine. The accomplishments of these heroes were legendary, and their life histories well-known and passed on down to aspiring young physicians. Further, these men were followed by a series of professors who were similarly single-minded about the primacy of medicine, and these powerful individualists maintained this ethos in many of the leading medical schools of the day. They included Robert Loeb, David Barr, William McCann, Warfield Longcope, Arthur Bloomfield, Henry Christian, Emmett Holt, Harvey Cushing, George Whipple and Ewarts Graham, to name but a few. All had a profound effect on young men and women entering the profession of medicine.

The period between the two great wars was, in certain respects, an age of innocence. Values were simple and high-minded. Thanks, in part, to the towering legends about those physicians, there was a belief that honesty, hard work, and dedication to high ideals in medicine and to the Hippocratic oath would lead to success. The profession of medicine was regarded by most as a special calling, similar to the church. Its priests were all men who seemed to live only for their medicine. Its highest priests were those who taught young doctors—hardworking, God-fearing, single-minded men, who put their profession and its practice first.

Doctors worked extremely hard, although medicine of the 1920s and 1930s was not a lucrative pursuit; the average yearly net income of physicians at the apogee before the 1929 crash was $4,100—just 1.5 times that of a skilled laborer. Further, much of the physician's time—particularly that of the teacher of medicine—was spent in the care of the poor, which produced no income. The rewards, painfully acquired through long hours of clinical observation, were prestige, respect from one's peers, and an expanding reputation as a superior diagnostician or therapist. Such a position was achieved only after years of work. But the older, accomplished physician was revered in ways that no longer exist today. All other facets of life—family, broader social goals, or fortune—were secondary to a selfless preoccupation with medicine, and to become a first-class physician was considered the ultimate of high-minded goals.

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MEDICAL EDUCATION IN THE 1930S

Walsh McDermott entered medical school at Columbia in 1931 directly from Princeton University where his record was undistinguished. It is revealing to examine how this could then be accomplished. Even in 1930, Columbia College of Physicians and Surgeons was considered one of the leading schools of medicine. How could an "average" student be allowed to enter its doors?

First, medical school of that day was not as competitive. Because of the long hours, the requirement that many human aspirations (such as marriage) be postponed, and low incomes, there were fewer applicants to medical schools then than after World War II. There was one striking exception to this. For Jewish families—particularly New York first- and second-generation Jewish families—one of the commonest and most intense of aspirations was for a son to become a doctor and have an independent professional career. But the medical schools of the 1930s were firmly controlled by white protestants, and anti-Semitic, anti-Catholic, anti-black, and anti-women sentiments ran high. Most schools therefore had an unwritten, but stringent low Jewish "quota." It was understood that Catholics and blacks need not apply except to their own predominantly Catholic or black institutions, and women made up only about 3 percent of medical school classes. The deans of medical schools all had powerful influence over admission decisions, and they tended to prefer the more "Americanized." They also looked with particular favor on the sons of doctors, who generally made up almost 25 percent of such medical school classes. One Italian-American physician, a contemporary of Walsh McDermott captured this vividly when he told me that he felt particularly fortunate in being accepted to a New York medical school, for after an interview the dean told him bluntly, "I like you, but I've already taken my one Italian-American for next year's class."

What, then, did Walsh McDermott have going for him? First, he was the son of a doctor. Second, while showing only a mediocre scholastic performance in most subjects, he graduated with honors in biology. Third, despite his Irish-Catholic background, he had long since left the church. And fourth, his Princeton physician preceptor who was a good friend of the Columbia dean, thought well of him and wrote a personal note to the dean in which he said:

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He is the son of a physician and has been brought up in good medical tradition. Personally he is an attractive lad with an excellent personality, good manners and a good cultural background . . . I feel that McDermott, throughout his work here with us has not done the best of which he is capable and the pressure of medical training will probably be the thing necessary to develop in him some of the latent capacity which, from my acquaintance, I feel sure he possesses.

Alas, he would not have been admitted to medical school today.

It is also worth noting that the places in which one could receive a respectable medical education were far more limited in the 1930s than today. Virtually all of the training institutions of significance were east of the Mississippi. Of the seventy-six medical colleges that existed in 1930, those considered most prestigious were clustered in New York, Philadelphia, Boston, and Baltimore. In the South, Duke and Vanderbilt were thought potentially promising infants. In St. Louis, Washington University showed hope of becoming a respectable institution, and on the West Coast only Stanford was looked upon as a medical school worthy of the name. As a result, many of the most ambitious who went on to become leaders in medicine often sought further study in Europe after medical school or internship to round out their training. Germany and Austria were "the places" to go, until about 1935 following Hitler's rise to power.

Perhaps it should give us pause to recognize that, in design and organization, medical education of the 1930s was not significantly different from that of the 1980s. Students who entered medical school spent the first two years studying the basic sciences of anatomy, biochemistry, physiology, pharmacology, and pathology. This was followed by clinical training, almost exclusively in hospitals, for the last two years. Course content was vastly different in the basic sciences. Medical genetics and molecular biology did not yet exist and immunology was primitive; but the nature of teaching and the approach were the same.

As mentioned, there were significant differences in the makeup of the student body. First, with the exception of the few special institutions noted, the medical students were almost exclusively young, white, protestant men. They came largely from middle- and upper-class backgrounds.

Secondly, tuition fees to medical school were within the range of most nuclear or extended families. The median yearly fees ranged

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from 200 to 300 dollars, with only a handful above 500 dollars. It was also much more common to be admitted to a school within one's own home town, so that students could live at home, which further reduced expenses. The students were, in the main, politically conservative, content with the general order of things, and accepting of authority within and without the classroom. Secondly, they were children of the depression years. Their parents were financially straitened, and many would continue to bear the "invisible scar" of those days and its impact on their families and their communities throughout their professional careers. Most, then, felt it an enormous privilege to be a medical student, and to risk institutional or professional wrath by questioning any aspect of their education was unthinkable. Thirdly, a shared set of simple values of love of the profession, of patriotism, of respect for religious values, family, and authority, and the lack of scholarly contact with blacks, women, nonprotestants, or those from poor backgrounds made them a fairly homogeneous group.

However, despite the insistence on conformity and the rigorous discipline of the first two years, there was more one-on-one teaching and somewhat greater opportunity to go at one's own pace in the 1930s than exists in medical pedagogy today. While the lecture and the textbook were viewed as the major vehicles for transmission of knowledge, all the preclinical sciences stressed learning by experience. Long afternoons in the laboratory accompanied each subject: the dissecting table was central to anatomy; meticulous study of the behavior of striated and smooth muscle preparations to physiology; and the effects of various pharmacologic agents on such preparations as the heart or gut to pharmacology; studying the effect of diet (usually one's own) on the excretion of metabolites in urine and stool preparations absorbed many hours in biochemistry. Searches for elusive cranial nerves, muscle insertions, and struggles with balky tissue preparations or troublesome smoked kymographs provoked numerous one-on-one consultations with professors and preceptors. These men did get to know students and vice versa in working settings—an interaction which has been lost with the "streamlining" of the present-day curriculum.

How was this possible? Though this may not provide the complete answer, differences in both ambience and numbers did produce more student-teacher interactions. The pace of medical science was more

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leisurely. There were no NIH grants, and faculty pursued their personal scholarly interests in mornings or evenings, when free of teaching duties. Teaching medical students was given high priority by deans and senior faculty, and full professors, as well as their assistants, were almost always in the laboratory. The numbers of students were also smaller. In 1930, there were only 21,597 medical students in all four classes at seventy-six medical schools—about one-third of the number today. Further, each class contained only fifty to seventy-five students, rather than the 125 to 200 common today. Social evenings for students at the professor's home were also common. In short, the opportunities for teachers to get to know each student were far greater.

Despite all this, the complaints and frustrations of medical students of those days about the curriculum of the first two years were very similar to those which are voiced today, and Walsh McDermott's feelings were characteristic of both periods. In a 1956 letter to Dr. W. Barry Wood, then vice president for medicine at Johns Hopkins, Dr. McDermott commented on some proposed curricular changes to be made at Hopkins during the late 1950s. He said:

> In my first year at Columbia (1930–1931) I learned virtually nothing except for the rudiments of gross anatomy which I promptly forgot. The course in physiology was so bad that it cannot be described . . . but fortunately . . . in the preceding year I had had a course in physiology under Phillip Bard at Princeton. The other courses at P & S [College of Physicians and Surgeons] were humdrum affairs which completely failed to deviate me from the flesh pots of New York City, and so far as I was concerned the whole year was wasted. I certainly learned virtually nothing. Although the faculty might not have been able to teach, they could perceive the failure to learn, and at the end of the year I was ranked 84 in a class of 103 students.

In yet another comment about his medical school experience, Walsh McDermott wrote, "Students came to medical school wanting to learn about disease and to be put off for two years seemed totally frustrating."

In contrast to the first two years, the clinical years seemed a joy to most medical students of the thirties. The courses in clinical diagnosis, in which the techniques of taking case histories and performing physical examinations were first taught, were enthusiastically received by students, anxious to get on to the business of "seeing

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patients." With the basic required skills laid out for them, they swiftly moved to clerkships, very similar to those of today, in medicine, surgery, obstetrics, and the newer specialty of pediatrics. As an examination of the content of the course in clinical diagnosis demonstrates, the teaching of interviewing skills or history-taking was much less sophisticated than what is taught today. Interestingly, although "listening" to the patient was emphasized, taking a case history was a rather mechanistic routine with the focus on symptoms or signs that might suggest physiologic derangements or organic disease. Almost no attention was paid to the social or psychological setting in which illness had emerged, and there was little encouragement to a patient to voice his or her concerns. The history was a strictly orchestrated accounting dictated by the physician's questions. Psychiatric problems received very little attention.

However, the physical examination—its teaching and its conduct—was quite different. Here the master teachers and diagnosticians excelled, and the deductive showmanship of some was legendary. What the skilled physician could see, smell, feel, or hear on meticulous examination of the patient determined his true worth. The gait as the patient entered—did it suggest Parkinsonism or tabes dorsalis or long tract spinal cord disease? The smell of the sick room—did it suggest renal failure, diphtheria, or typhoid? The pulse was meticulously observed. Did it suggest hyperthyroidism or aortic insufficiency? The examination of the chest and heart was a long and demanding ritual which took years to perfect. These were skills to be honed and practiced continuously, and students watched masters of this art daily on bedside rounds. Medicine of the day was a do-it-yourself discipline in which one's own observations rather than those of others or the laboratory ranked supreme. Young physicians soon realized how many times the correct diagnosis could be achieved by trained observation, unaided by much in the way of technology except for a stethoscope, a flashlight, and an oto-opthalmoscope, and they strove to emulate.

Looking back, there was perhaps another quality of the physical examination of that day which had therapeutic value, overlooked at the time. This was "hands-on" medicine. The physician devoted himself, physically and intellectually, to determining what had gone wrong with another human being—his patient. This had an impact on the examinee as well as examiner.

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The setting for clerkships was almost exclusively inpatient. They were carried out on the wards of large charity hospitals or the public wards of voluntary hospitals. The teachers consisted of a few dedicated full-time faculty, supplemented by much larger numbers of voluntary faculty who earned their income in practice, but devoted significant amounts of time to caring for the sick poor and to training medical students. There was no Medicare, no Medicaid, nor any other form of third-party payment, and patients in large public hospitals and the charity wards were the poor who traded the use of their bodies to train medical students and young residents for their care. Public hospitals and charity wards offered in technical qualities what they lacked in esthetic considerations and creature comforts, deemed more important today.

Today, I am sometimes asked why faculty—particularly those who derived their income from practice—were willing to give so much time to the care of these hospitalized poor patients and to the business of training those striving to become doctors. This was true, partly because of the almost militantly altruistic ethos of medicine of the day. But there were practical reasons as well. First, because of the nature of medicine, not one doctor in one hundred could turn all his waking hours into financially rewarding practice. And more importantly, scientific advances in medicine were beginning to come more swiftly, and all serious physicians who worked in cities felt a need to have a major hospital connection in order to remain abreast of what was happening in medicine. At this time, hospitals (and the public hospitals were generally regarded as the best places to learn) took care largely, if not exclusively, of the poor.

Hospital positions were, as a result, much prized and competitive. Indeed, the hospital hierarchy set high hurdles to be surmounted before real privileges were granted. Commonly a young physician, new to practice, would be required to spend between one and three years giving at least two half-days each week to the hospital outpatient clinic before being considered for a more respected role. If he performed his duties faithfully, he would then graduate to work as an attending on the wards, teaching and supervising students, interns, and residents. Finally, if deemed worthy—often after four or six years—he would be granted admitting privileges of his own.

This applied even to physicians whose offices were in the most deprived and poorest section of inner cities. Here, a position on the

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staff of the public hospital was much sought after, for patients discharged from those hospitals would commonly become the office patients of the physician who had supervised their inpatient care.

In keeping with the "do-it-yourself" philosophy of the times were the limited technologies used in the management of patients. It was medical students and interns who did virtually all the laboratory work on new patients. The urinalysis, the initial blood work, and examination of sputum or feces were carried out by those physicians in training who were caring for the patient. So were simple blood chemistries. The young physician had at his own command virtually the entire armamentarium of information to be used to help his patient. This sometimes posed philosophical problems for him, as another of Walsh McDermott's descriptions reveals.

> If (in a patient with pneumonia) the sputum typing revealed pneumococcus type I or type II, the patient would receive horse or rabbit antiserum intravenously, every two hours around the clock. This itself represented a new technology and it too had effects on the physician as well as on the sick who were receiving it. For the typing process had to be performed by the intern on patients admitted "out of hours," i.e., after 5:00 p.m. If the identification was type I or type II, it meant that the intern would have to stay up for the rest of the night administering the serum intravenously every two hours. By contrast, if it were any of the types other than I or II, the intern could go to bed. Thus, the young physician would find himself/herself, perhaps for the first time, facing a serious technoethical problem. Churning around in the same physician would be the human and professional instincts to hope that the critically ill patient had a pneumonia of a type that would be treatable; yet if that hope were realized, it meant an all-night bi-hourly assignment for someone with awful fatigue of having been working steadily and hard since early the morning before. A physician's habits, practices, and attitudes of a life-time could be forged at that very point.[1]

On the inculcation of values, Walsh said at another time:

> I had some very good teachers in medical school and when we started clinically the first thing they said was "McDermott, the one thing you gotta know is you gotta be as good at four o'clock in the morning as you are at four o'clock in the afternoon" and that's it. What is it that imprints that in anybody and keeps them doing it?[2]

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The answer is evident in the statement itself. But it should be noted that the occasions were rare when the physician actually had important technical interventions that he could introduce for the patient's benefit. In moments of thoughtfulness, physicians were often frustrated and saddened by the pitifully few times that their ministrations made a real difference.

THE HOSPITAL SETTING

As previously mentioned, virtually all the teaching of physicians was carried out on charity services. Only slowly did wealthier people begin to take advantage of hospital practice. Gradually, an increasing number of obstetrical deliveries for the well-off were carried out in the hospital (between 40 and 70 percent by 1930). Also, thanks to anesthesia and antisepsis, surgery was a rapidly advancing discipline in hospitals. But, it was really the experiences of World War II that changed both the reality and public perception of what medicine and the hospital could do to improve the outcome of serious or life-threatening illness. For, during this time, some 15 million servicemen and their families had contact with the best that medicine of the day could offer. The antimicrobials had come into use, and the American public realized that only 4 percent of battle casualties who had the good fortune to reach medical care actually died. It follows that the perception of the hospital as a place in which the poor could die was transformed; people came to understand its importance as the major laboratory permitting the physician full use of his most important technologies.

In 1930, there was still a profound difference in the kinds of disease that confronted both the aspiring physician and his mentor in the hospital, and this set the tone for medical practice. The setting has been compellingly described by Walsh McDermott:

> Let us start with an imaginary entering of the male medical ward of the Bellevue Hospital of New York City on any March day in the early 1930s. The situation in other municipal or university hospitals in the northern United States differed in the externals, but not in the nature of illness that was affecting the patients housed within them.
>
> At Bellevue, the ward was impressively large with high ceilings and windows only at the far end. The most striking features were the patients in

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high beds and low cots. The high beds were arranged with backs to the wall. The cots ran the center of the room.

Generally speaking the patients were distributed throughout the beds and cots according to the seriousness of their illness. The sickest patients were in the beds closest to the entrance and were arranged in sequence according to rough estimates of disease severity. To the extent possible the cots down the middle were used for those who were convalescing.

In the first 5 to 10 beds on the right would be the patients with pneumonia, with the sickest in the first 2 or 3. They looked terribly ill. The temperature on the chart at the foot of the bed would show 103, 104 degrees Fahrenheit, or more.

The patients were weak—so weak that the daily examination had to be carried on most carefully and those in oxygen tents could not be kept long outside them. Yet it was of the greatest importance that the examination be done because if the pneumonic process had ruptured through the pleura and produced an empyema, this could be successfully treated only by immediate surgical drainage.

Next to the patients with pneumonia would be one or two patients sitting up in their beds, who had congestive heart failure resulting from syphilitic heart disease. Not infrequently one might have a grapefruit-sized pulsatile bulge distorting the upper chest. This meant that in addition to the aortic syphilis involving the heart valve, there was an aneurysm of the aorta, an out-pocketing that might eventually burst.

The next four of five beds would contain patients with another form of congestive heart failure—that consequent to rheumatic heart disease. Most of these patients would be in their late twenties or early thirties, but a few might be little more than children.

In the left-hand rows of beds would likewise be patients who were quite acutely ill. At the first bed, somewhat separated from the others, one might see a hand basin, scrub brush, and a rack with gowns. The patient would be lying in semi-stupor, a sailor from Latin America brought in with typhoid fever from a ship that had just docked.

The next two beds would be occupied by patients in coma with pneumococcal meningitis. In the particular cases the meningitis had arisen from chronic middle ear infections. The course of pneumococcal meningitis was almost invariably fatal, and fairly rapidly so.

In the next bed might be a man with bacteremia due to streptococci. A barber by occupation, he had repeatedly stuck his finger on a safety pin used to pin on his smock with each new customer. He would have essentially no

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hope of recovery. Next might be a boy of 15 with high fever who had just been discovered to have a peritonsilar abscess. He would be soon transferred to surgery where it was hoped that the drainage of the abscess would stave off mastoiditis and its risk of streptococcal meningitis.

At the end of the row of beds there would be another surrounded by basins, gown racks, scrub brushes, and similar paraphernalia. But unlike the patient with typhoid, this patient would look strangely healthy, alert, bright-eyed, and indeed would be reading a book. This would be a young father aged 22, a machine tool operator with far-advanced pulmonary tuberculosis awaiting transfer to the chest service which, despite having 200 beds, was always filled to overflowing. At this period tuberculosis in the United States was the greatest cause of death and disability in people aged 15 to 45.

In the 1930s, the diagnosis of active tuberculosis was a life-changing event. It meant giving up one's job and place in home and school, and accepting institutionalization for one or more years in a place frequently several hundred miles away. What is more, once in the institution, at least for the early months, the customarily lively young person with tuberculosis would be confined to bed.

The surroundings were nicer, but the infringement of personal liberty was little different from that of prison. And unlike the blows felt today from the news one has coronary heart disease or a cancer, the blow dealt by the news of tuberculosis was frequently suffered by 25-year-olds. Because, at the individual level, tuberculosis tended to arise in a setting of chronic fatigue, it seemed to be especially prevalent among ambitious young people who were burning the candle at both ends. Young people with two jobs plus courses at night school were a familiar sight in the tuberculosis hospitals, and the disease was considered an occupational hazard among medical students and hospital residents. To them the disease struck with what appeared as a career-shattering effect: they would have to leave medical school, never again would they be able to do what they had been physically able to do, and it would be pointless to dream of anything but the most muted careers in medicine.

But sad as they seemed, their problems were minimal compared with those of a 25-year-old wife of a blue-collar worker just home from the hospital with her third child. The disruption of lives involved in removing her to Saranac or to a tuberculosis hospital in the city can only be imagined. And while in the act of imagining, one must also realize that these happenings were not rarities, but occurred each year in the lives of literally thousands of people in the United States.

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Between the patient with the peritonsilar abscess and the patient with tuberculosis, one would walk by several patients with what was regarded as a very light illness, so-called catarrhal jaundice, now recognized as viral hepatitis. Conversation could be readily carried on with these patients, who indeed might seem eager to talk about the affairs of the day. The situation would be similar with the patient in the next bed, a 14-year-old boy with his third bout of rheumatic fever. The young patients with this disease were intensely appealing. They had a pinched look about the face as if everything was retreating from the tip of the nose. There was usually a sort of hospital pallor, although it might be occasioned in part by anemia. The outstanding characteristic of these children was their incredible maturity. Periodically since early childhood they had been thrust into the company of men sorely tried by disease and from them they had gained wisdom far beyond their years. The men, with a pathetic rough nobility, would attempt to protect them as best they could. Although at any one time for long periods these rheumatic children were not particularly ill, conversation with them would somehow give the feeling that they had intimations of mortality. One could never be entirely sure whether knowing their fate they were facing it with gallantry or whether they might be simply ignorant of it. Yet they really could not be unknowing with so much disease and dying before their eyes in their daily life. One could not help but be deeply touched by meeting them. It was not so much that they appealed to one's sympathies with an acute distress; it was a more haunting feeling that one had encountered the philosophy of a resigned old person in the body of a child.

The conversation with the patient in the very next bed, however, might not have been so easy, for he would have one of the all too common complications of rheumatic heart disease, subacute bacterial endocarditis. This horrible disease represented a death sentence. With persistent fever, anemia, great weakness, and sallow color, such a patient would closely resemble one with leukemia. There would be emboli, some small, producing tender fingertips, others large, producing painful areas in back or flank, or the paralysis of a stroke. Although in the absence of serious emboli the patient might be free from pain, unlike the patients with tuberculosis they tended to be taciturn. They seemed to have a pretty accurate notion of their future and no wish to discuss it.

This particular assemblage of microbially-produced illness did not represent all of the illnesses present in the male medical pavilion at a single moment in the early 1930s. There were also patients with peptic ulcer, cancer of the digestive system, leukemia, hypertension, arteriosclerotic heart disease, strokes, diagnostic problems, and individual instances of rare or exotic diseases. But the microbial disease entities described represented the

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primary disease in something over half of the patients. They required the major portion of time in terms of the medical and nursing care and they were responsible for most of the fatalities. It is no exaggeration, therefore, to say that they formed the essential character of the disease pattern of the day. Although as a result of economic improvement and public health measures some of the diseases were not so frequent in society at large as they had been 100 years previously, grouped together in hospitals, the resulting disease pattern of that 1930 Bellevue ward was really no different than it had been in hospitals for at least a century. Yet within less than 20 years, all this was to change in a way no one had previously dreamed.[3]

THE PRACTICE SETTING

What of the private-office practice of medicine? When faced with acute life-threatening illness, its problems resembled those of the public hospitals. However, much more of the one-on-one care was conducted in the physician's office or the home. Most practicing physicians were generalists who used specialists sparingly in consultative roles. The chronic degenerative diseases which form the bulk of medical practice today certainly existed, but they were masked by the drama of acute microbial diseases and premature death. The physician generally knew his patient, his family, his social and economic setting, indeed much of the fabric of his life and his ways of coping, as a result of many years of contact. There was a stronger belief in the therapeutic power of the physician's presence *per se*. With less effective technologies to apply, the physician more commonly "shared" in the agonizing process of waiting for "nature to take its course" or in helping patients cope with illness that could not be modified medically, and families derived comfort from that sharing.

Many physicians trained during this period have bemoaned the loss of what has come to be regarded as "those good old days." They were simpler times, but were they really as effective in the training of first-class physicians as we thought? In some ways, yes.

An admirable value system was firmly imprinted on most physicians. Nothing was too much to do for a sick patient, irrespective of his status or the hardship or inconvenience it might cause the physician. The relief of suffering "to cure sometimes, to comfort always" was not an idle abstraction.

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There were, however, gross inequities in the system which were to become increasingly evident in the years to come. While most physicians took responsible care of those who found their way to them, many people, particularly the poor in rural and urban areas, simply did not. We now know that in the teeming slums of large cities such as New York, Boston or Chicago, and in remote rural areas, particularly the South, those who were poor saw doctors less than half as frequently as those who were well-off, despite their greater burdens of illness and early death. But, in contrast to today, doctors did live and practice in slum areas, often making do financially in volume rather than in quality. They did make house calls—often charging between fifty cents and two dollars, or accepting other goods in trade for long vigils. They made heavy use of the outpatient departments of the public hospitals for their sicker patients, but they knew them and their families, and gave generously of their time and talents. Perhaps the least well-served of all were the rural poor—particularly the black rural poor of the South. For them, the graduates of the two black medical schools, Meharry in Nashville and Howard in Washington, did missionary service by returning many of their graduates to these areas—a story which bears telling in a separate volume. But the ratio of black doctors to their patients was between one-tenth and one-fiftieth that of white physicians to their white patients, and the lack of adequate care was painfully apparent in black infant mortality rates (two to three times those of whites), sharply reduced black life expectancies, particularly among black males, and a shameful incidence of the untreated results of hypertension and syphilis.

Lastly, because the training of medical students and young physicians was carried out almost exclusively on "charity" patients, a two-class system of care existed which placed a large emotional moat between a physician and some of his patients. Recently Dr. Paul Beeson, a distinguished contemporary of Walsh McDermott, made the following comments about the medical training of that day:

> Perhaps the first thing to be said is that most of the teaching hospitals were true charity hospitals. My recollection is there was a real social gap between the providers and clients. We thought of ourselves as kindly people and also as charitable people. Indeed most of our teachers were doing their teaching on a volunteer basis and making their livings in private practice. Medical students never saw the doctor-patient relationship in the private practice

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situation. During internship there was some exposure to this, but the thing I am emphasizing is that we considered ourselves in a different kind of society from our patients and I suppose there was some unvoiced assumption on our part that they were lucky to have us giving them care. I recall one Sunday morning when I had to go down to the medical ward at the Montreal General Hospital for something and took along a couple of preclinical fraternity brothers who just wanted to see what the Montreal General wards were like. I took them on a ward round myself and stood at the end of each bed, probably without nodding to the patient in that bed, and told them quietly what was going on with each patient. We moved along from bed to bed all around the ward and I remember feeling quite smug when one of the freshmen medical students said to me "It's interesting how impersonal you were and how you could stand there talking about each patient without any feeling of embarrassment." Well, I am embarrassed about it now.

Similarly, our teachers, when they made ward rounds with a larger group, did not usually say much of anything to the patient as they moved from bed to bed. We all prided ourselves on those code words which we could say within the patient's hearing, assuming that the patient would not understand—words like lues, mitotic figures, and so on. I'm quite sure that when the attending man left the bedside he did not put a hand on the patient's arm or look the patient in the eye or stop to say anything about what was going on. The main function of the attending physician in medicine then was to demonstrate physical diagnosis since we had such inadequate diagnostic technology.

Another thing that I regret is that we never told patients when the prognosis was unfavorable. We did indeed tell the families, but in nearly all instances this was a conspiracy to be kept from the patient. In rare instances when the patient would ask right out what the outlook was we lied about it and our teachers lied about it. I remember once . . . when a patient had read her chart saying that she had an inoperable cancer. When the attending surgeon came along with his troop of followers she stopped him and asked about that and without an instant's hesitation he said, "that's fine Mrs. ____, that means you don't have to have surgery." We sailed on thinking what a great bit of quick wittedness that had been.

The wards were large open wards and the patients in neighboring beds often heard the discussion at ward rounds. There is, of course, much criticism about ward rounds being conducted in conference rooms away from the patients today, but in my opinion that is not all bad.

The outpatient departments of big charity hospitals were bare and gloomy affairs. There was no appointment system and patients would come

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in and sit for hours on hard wooden benches until a doctor would emerge from an examining room somewhere down the corridor and shout the next patient's name. The patient would then get up and scurry down to the examining room.

The tradition of clinical investigation was young and there was not much thought given to the propriety of carrying out tests on charity patients. We didn't explain to them why we wish to conduct a certain kind of test on them, we just left word that the patient was to be transferred to such and such a place at such and such a time. . . . The patients were not asked if they would give permission, and it was not explained to them.

Dr. Beeson concluded his commentary with the statement, "In short the changes are not all bad."

This, then, was the setting in which medicine was taught and practiced fifty years ago. It was easier to get into medical school, but the ethos of medicine required that virtually all other human interests play second fiddle to the stern mistress of medicine. Doctoring was not, in the main, a very profitable business, but medicine's prestige was immense, and physicians were highly esteemed members of their communities. Little could be done technologically to change the course of human disease, but the discoveries which would usher in more effective management of many human illnesses were beginning. A major world war, increasingly sophisticated biomedical science, a public commitment to supporting it, and a mounting belief that medical care was a "right" which should be available to all Americans were to change it profoundly in the years to come.

ENDNOTES

[1]Walsh McDermott with David E. Rogers, "Social Ramifications of Control of Microbial Disease," *The John Hopkins Medical Journal*, 151 (6) (December 1982): 302–312.

[2]Personal Correspondence to David E. Rogers, M.D. from Mrs. Irma Sway, July 15, 1984.

[3]McDermott and Rogers, op. cit., p. 305.

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Eric J. Cassell

Ideas in Conflict: The Rise and Fall (and Rise and Fall) of New Views of Disease

THROUGHOUT THE HISTORY OF MEDICINE there has existed a dispute between those who see disease as a generalized phenomenon and those who hold that diseases are localized entities.[1] The former idea, often called the physiological conception of disease, was embraced by the Hippocratic school, which saw the origins of disease in an imbalance between the forces of nature within and outside of the sick person. The latter viewpoint, the ontological conception of disease, understands diseases to be *entities*, things that invade and are localized in parts of the body.[2] One or another of these conceptions of disease has always held sway in medical thought, sometimes for centuries.

Galen, whose writings were influential for fourteen-hundred years, was essentially a "physiologist" who traced his understanding of the natural forces in and around the sick person to Hippocrates and Aristotle.[3] ("Physiology" in this sense implies an understanding of the *physis*, the natural forces acting both within and outside the person. The usage is *not* restricted to internal processes as in the modern use of "physiology.") Although Paracelsus successfully challenged Galen's influence, it was not until Sydenham, in the late seventeenth century, that the ontological viewpoint began to reenter medicine and its practice in strength. The triumph of the resurgent ontology was complete with the work of Virchow on the cellular basis of disease and the bacteriological discoveries of the nineteenth century.[4] But the last fifty years, the period since Walsh McDermott entered medicine, has again seen conceptions of disease and its causes swing away from

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the ontological and towards the "physiological"—currently called the ecological—perspective.

Francis Bacon envisaged science as making perhaps its most important contribution to human progress in medicine; nonetheless, science came late to medicine. Independent discoveries, such as those of the great anatomists or the early physiologists were of unquestionable importance in understanding the human body. They could not be brought to bear on medicine, however, until the manifestations of sickness were systematized in a manner that allowed physicians to know when they were dealing with the same problem—does this patient with rash and fever have the same disease as that patient with rash and fever? And that could not come to pass until a theory of medicine developed that emphasized and unified the actual phenomena exhibited by sick persons. Previous theories, such as those of the vitalists or the mechanists, despite the claims of their varied and vehement champions, were so concerned with ultimate causes as to be of little relevance to what was going on at the sick-bed and were of practically no use to clinicians. Indeed, clinicians, believing themselves to be pragmatic folk, have generally disparaged *any* theory. In any case, the disputes between theorist and practitioner, between rationalist and empiricist, have pervaded Western medicine from its Greek beginnings, independent of which theory of disease—ontological or physiological—prevailed.[5]

I am going to suggest throughout this essay that how well a theory that is fundamental to medicine *works* has a profound effect on how doctors behave, on relations within the profession, on relationships with patients, and even on the power of the profession in general. This is a difficult topic because physicians generally view themselves as realists who disdain all theorists and philosophers. Why doctors think this way about theory is not clear, but having dismissed theory, they often do things with unhappy results because they do not really know *why* they are doing them. For example, when a patient has a widespread cancer whose primary (place of origin) is unknown, physicians will often go to great lengths to find the place of origin even though it may cause the patient great discomfort without offering *any* benefit. They do this because disease theory dictates the importance of making a diagnosis—knowing the disease. Widespread cancer (metastatic adenocarcinoma) is not a diagnosis in doctors' terms; metastatic adenocarcinoma from the stomach—now

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that's a *doctor's* diagnosis. Unfortunately, when physicians do things like this they may bring into conflict two or more of their own values. In this instance, the need to know the disease conflicts with the more fundamental dictum, "above all, do no harm."[6]

Whether doctors like the idea or not, human action is inevitably theory driven. We act as we do (we even see what we see) because we have an idea—a theory—about what the consequences of our actions will be.[7] Medical actions are also dependent on theory because they are undertaken with a belief about possible causes and consequences. But when individual physicians have theories that are at wide variance from one another, or theories that, while similar, are far removed from direct clinical experience, then little basis exists for common understanding. We are able to speak together only because of a common language for objects and events. A common language for something implies a common interpretation of the events signified by the words. The disease called "catarrhal jaundice" became "viral hepatitis." "Viral hepatitis" then split into "hepatitis B" and "hepatitis A." Then "non-A non-B hepatitis" was added, and most recently "delta hepatitis" joined the group of diseases that had all been included originally in the category "catarrhal jaundice." Each change in terminology is accompanied by a change in the content of the notion signified by the word.[8] When several doctors talk to each other about a patient with hepatitis B they have in their minds ideas about source of infection, incubation period, course of the illness, progression to chronic liver disease, possibly even ending with cancer of the liver. In fact, however, at just one moment in time they do not *know* whether most, or even any, of the ideas that they share about hepatitis B apply to this particular patient. They do not share concrete matters of fact about *this* patient, but rather abstractions and theories about hepatitis B in general. I would like to extend this notion further by suggesting that the more solidly we all share the same theories about disease and its causes and treatment, and the sturdier and more resistant to attack the theory is, the more solidly united and impregnable is the whole profession. I believe Harris Coulter is correct when he says that, "professional coherence is engendered by doctrinal coherence."[9]

The opposite is implied. When the primary theories that bind the profession together begin to come apart, or their weaknesses are exposed, then the profession as a whole begins to lose coherence.

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Such is the case at the present time when the theory of medicine is in transition. One has only to see how expansive and vaunting chiropractic clinics have become to recognize how much weaker is the current hold of medicine's theory on the general population. This observation in the face of modern medicine's obvious therapeutic effectiveness should also help drive home the fact that humans act on their interpretations of events—their theories—not on events themselves.

THE RISE OF DISEASE THEORY

It is the genius of the disease theory of medicine, which came into being in France in the first decades of the 1800s, that it provided both a common basis of understanding for doctors and a basis for bringing science to bear on the problems of medicine. Diseases in this system of nosology, epitomized by Laennec's discovery that, despite its diverse manifestations, tuberculosis was one disease, are characterized by both a unique pathologic anatomy, and a unique cause. The classification of disease has occupied such a central place in the history of medicine until the middle of this century, that it is useful to quote Faber to understand why it has held medicine in such thrall.

> The attempt to "describe the diseases" borrowed from descriptive natural history has been found to be inseparably bound up with the quest for the causes of the morbid phenomena. Clinical medicine is, therefore, at work, like the other natural sciences, . . . at the great task of attempting to understand natural phenomena in an attempt to control them. . . . It does not stop short at this, however, but goes on to construct by synthesis, clinical pictures of individual diseases subject to fixed laws in their course and development. . . . These clinical pictures of disease . . . denote a delimited group of natural phenomena produced by some definite cause. . . . To the physiologist and worker in the laboratory, morbid categories are subordinate concepts, but to the physician, to the clinician, the reverse is the case; he cannot live, cannot speak, cannot act without them.[10]

It follows from disease theory that the purpose of the clinician is to discover in the sick patient that unique phenomenon with its unique cause that is the disease (and is thus considered to be the source of the sickness), and to base diagnostic and therapeutic actions upon that goal. The great clinicians of the 1930s exemplified these practices. In

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those years, medicine was captivated by the promise of sicence and the hunt for diseases and their causes. American medicine was not long out of an era of poor medical schools and inadequately trained physicians.[11] Many physicians augmented their education by study in Europe, and German medical ideals were extremely influential. World War I provided the impetus to develop the testing ground for new techniques and understandings. Further, enough specific treatments had become available to enable physicians to see medicine of the 1930s as tremendously advanced in relation to just a few decades earlier. X-rays, blood tests and other laboratory studies—generally carried out by physicians themselves—provided a precision that previously had been lacking. A medical school graduate of 1934 recounted that he specialized in urology, in part, because, with the advent of the intravenous pyelogram, when "I told my patient what was wrong, I *knew* that was what was wrong."[12] This hunt for precision in diagnosis has characterized medicine since that time.

It would be a mistake, I believe, to understand by precision only the accuracy of newer diagnostic techniques. The true precision was the precision of thinking brought to medicine by disease theory and science—and present throughout this country by the 1930s. That an equivalent therapeutic effectiveness did not yet exist at that time was beside the point. Physicians who had known no decisively effective armamentarium could not miss what had never existed. But the intellectual climate held promise of things to come. The specific antisera for diphtheria and then the pneumococci, thyroid extract, insulin, and the advent of the sulfonamides later in the decade were payments on the promise and provided the beginnings of the current therapeutic revolution.

TROUBLE IN THE TEMPLE: WEAKNESSES IN CLASSIC DISEASE THEORY

But even in those early years, when the prospect of the first era of cure in the history of medicine seemed to be dawning, trouble was apparent. There are two weaknesses of the disease theory and the medical science of the era. This fault in medicine's foundations would ultimately threaten the whole edifice. The first is the fundamental place held by the idea that each disease had one and only one cause. The second was the belief that function is founded on structure and

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therefore, changes in function imply changes in structure. Both ideas, on which the theory of disease is based, have been undermined by the advance of medical science.

First, let us look at the concept that every disease has a specific cause:

> The principle of etiological specificity of disease implies that every disease entity is produced by a quite particular cause, that different diseases cannot arise from the same cause, nor can different causes produce the same disease. We now conceive of each of the pathological processes as a single, gradually developing phenomenon resulting from the action of a specific etiological agent, though with variations depending on individual circumstances or external conditions. Symptom-complexes cannot pass for diseases.[13]

The infectious diseases provided the perfect model for such understanding. Indeed, by the end of the nineteenth century and the beginning of this one, the discoveries of bacteriology encouraged the belief that, by merely preventing the transmission of microbes, disease would be controlled.[14] This idea of cause has the advantage of restricting the viewpoint of physicians to the disease itself and to immediate causes. It also allowed the emphasis in therapeutics to be shifted away from the crude empiricism that had pervaded medicine toward a search for treatments that got at "the cause." The degree to which this idea took hold can be seen in the manner in which modern patients prefer such treatments over those that merely get at "symptoms."

This idea of cause, however, is essentially artificial. Causation is rarely so simple or direct. In the 1950s this was exploited by Rene Dubos in his writings about human ecology, when he was able to use the fact that, while the tubercle bacillus can be demonstrated in all people with tuberculosis, the opposite does not hold true. All people exposed to, or harboring, mycobacteria do not develop tuberculosis. This concept of cause essentially excludes factors within the patient as host to the disease, or aspects of the environment which may promote the disease. Because of this, a patient may be considered successfully treated for pneumococcal pneumonia, for example, without addressing the malnutrition or other problems that virtually assure that the patient will soon be sick again.[15] Because disease theory so effectively concentrates medical attention on the disease and the classical understanding of its cause, such other factors may be

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dismissed as non-medical—in the province of, say, social workers. Although people will continue to prop up ideas that are inherently weak, such beliefs are eventually eroded in the face of clinical experience that speaks otherwise. In the care of the chronically ill and the aged, "non-medical" factors contributing to illness loom so large that they cannot easily be laid aside. Similarly, medicine's constituency, its patients, increasingly demand attention to issues such as nutrition and "prevention" that involve understandings not contained within disease theory.

Perhaps the biggest blow to the cardinal place of "unique causes" has been the therapeutic revolution itself. With the exception of antimicrobials, *none* of the fantastic array of effective therapeutic agents is directed against the "cause" of the disease. Allopurinol interferes with the production of uric acid, but elevated uric acid is surely not *the* cause of gout. Tricyclic antidepressants have been a major advance in the treatment of depression. Their effectiveness may be related to their effects on brain neurotransmitters, but nobody believes that abnormalities in those chemicals are the *cause* of depression. Both beta-blockers and calcium channel blockers have dramatically improved the treatment of angina and coronary heart disease, but neither is aimed at the cause of the disease. The list could go on and on. The idea of unique cause, for all the attractiveness to laypersons of treating "the cause," has not been too useful from a therapeutic standpoint. In fact, doctors know very well that they no longer treat causes, whatever they may tell themselves.

The other conceptually important, but basically weak, aspect of classical disease theory is its dependence on the idea that all changes in function are referable to changes in structure. In the everyday medical world, this has made the search for a diagnosis essentially the search for altered structure. If a patient had symptoms referable to the stomach, perhaps an ulcer was present. X-rays were taken. If they demonstrated the ulcer, the patient had a disease. If they did not show an ulcer (or other alteration in structure) it was possible to dismiss the patient's complaints as "nerves," or acid indigestion. As another example, a patient lies racked with back pain on an x-ray table, but the x-rays do not demonstrate an abnormality of structure—herniated disc or some similar entity. The patient can be told that there is "nothing wrong." It is obvious that *something* is the matter or the person would not be in such pain. But no disease is present. Patients

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have the rather naive view that when they are sick and go to doctors, the doctors are trying to find what the matter is. That is not the case. Doctors are trying to find out whether a disease is present. Disease theory has been enormously successful because much, if not most, of the time it *works*. When something is wrong, a disease is there to find. The difficulties with this approach were already commented on by Peabody in 1927 in his classic paper, "The Care of the Patient."[16] In some circumstances the approach does not work at all—despite psychiatry's enormous efforts, mental disorders almost never fit the classical criteria for disease. In other situations it works too well—the aged have many diseases, but acting on them often leads not to benefit, but to illness from overtreatment.

As knowledge has advanced, the firmness of the distinction between structure and function has given way. Are alterations in function based on enzyme induction (changes in enzyme action that are brought about in some situations but not others) or change in genes due to altered structure? Certainly not in the classical sense. The idea of structure is an artificial one. Structure is what you see under a microscope. Structure is what pathologists tell us about (which is why disease theory made the pathologist the referee of medicine). But what you see under the microscope is not what is happening in sick people. Nothing in nature holds still like that—everything is changing all the time. What we call "function" merely changes fast enough for us to measure it in a clinical setting. The best example of the failure of classical structural disease concepts (or their enfolding into function) is chronic obstructive pulmonary disease—the term that has come to replace the structural diagnoses, emphysema and chronic bronchitis. Epidemiologists in the United States and Great Britain could not find structural changes in the lungs that were consistently associated with functional impairment in breathing common to patients in England and America. They ended up agreeing that the *definition* of the condition to be called chronic obstructive pulmonary disease was to be: a patient who coughed and brought up phlegm for as much as three months a year and who had done that for at least two years! No such definition existed previously in modern medicine. Chronic obstructive pulmonary disease is a reduction in the ability to breathe (characterized by certain sharply defined abnormalities in the physiologic measurement of the breath-

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ing function) that occurs in the presence of various structural changes—there is *no* unique alteration in structure.

Scientific advance, not theoretical deficiencies, ultimately undermined the fundamental place of the structure-function relationship in disease theory. The enormous and exciting advances in medical science during the last generation have not been primarily about diseases, but about how the body functions in health and disease. Knowing diseases, in the old-fashioned sense, is not nearly as important as knowing pathophysiology. The modern physician's ability to treat heart disease so effectively depends on current knowledge about how the heart functions. The heart can be seen, and intervened in, as a muscle pump, as a hydraulic system, or as an electrical system, in a manner that is vastly better than when it was considered the seat of rheumatic heart disease, syphilitic heart disease, arteriosclerotic heart disease, and so on. Because the language of structure remains common among doctors and is simpler than the language of function or process, physicians still talk structure—but they increasingly act on functional abnormalities without concern for structure. The autopsy room used to be the central theater where disputes about the diagnosis of difficult cases were resolved—doctors do not even bother to go and see autopsies anymore. The reason that current therapies are not directed at "the cause" is that knowledge of pathophysiology—the concatenation of events that distinguishes abnormal function from normal physiology—provides the opportunity of designing therapies that will interrupt the abnormal chain of occurrences and meliorate the disease. As effective as the diagnostics and interventions are, however, when people speak one way while acting another, an inevitable strain is induced, which undermines professional coherence. In times of transition there are always paradoxes whose resolution requires intellectual energy that might better be employed elsewhere.

THE RISE OF THE ECOLOGICAL PERSPECTIVE

The Second World War widened the horizons of medicine. For the first time in such a definitive manner, Western technological medicine reached across national and cultural boundaries. The thirties had shown the promise of modern medicine, and, during and immediately after World War II, that promise truly began to be fulfilled.

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Effective antimicrobial agents existed for many of the infectious diseases, including tuberculosis, that would previously have decimated undernourished and war-torn populations. The control of rickettsial and malarial vectors had been demonstrated to be possible. The success of medicine and its technology after the war transmitted an image of hope and of the potential goodness of humankind. Medicine and medical science seemed to herald a new world.

But with the successes there also came failures. As discussed by Kurt Deuschle elsewhere in this volume, by the 1950s there was overwhelming evidence that technological medicine did not easily cross cultural boundaries, if doing so required the active acceptance of the *beliefs* behind the technology. A frequently cited example of this is the difficulty in getting indigenous populations to accept the concept of microbes—to boil water or use sanitary facilities.[17]

By the late forties and the fifties, it was indisputable that cultural or social factors were important elements in the development of disease. But this knowledge was peripheral to conventional medical education. This was the fifties, the heyday of classical disease-oriented medicine. It was, I believe, antithetical to mainstream medical thinking of the time that, not only were diseases modified in their presentation and course by cultural factors, but that there were cultures that could not be dismissed by the pejorative term "primitive," that saw issues of health and disease quite differently from the way we do. My own experience is illustrative. I had been trained in internal medicine in the Third Medical Division of Bellevue Hospital (in our eyes, Mecca) when I joined Walsh McDermott's Department as a Fellow. In 1959, in preparation for teaching a Public Health Seminar to third-year medical students entitled "Medicine Across Cultural Boundaries," Walsh gave me a number of books, World Health Organization pamphlets, and papers about the problems of cross-cultural medicine. I read them with care. It is not an overstatement to say that they completely changed my understanding of medicine. As a result of my training, and in common with most physicians at the time, I tended to see the problems of sickness in terms of diseases that could be discovered within patients. Diseases were acted on directly, to the extent that such treatments were possible. In therapeutic acts, the patient might be a help or a hindrance in achieving access to the disease, but in any event, the disease, not the patient, was the primary focus of my concern. When

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patients were found to have tuberculosis, I had no difficulty with the simple facts that tuberculosis was the cause of their illness, and the tubercle bacillus was the cause of their tuberculosis. The material that McDermott gave me cast irrevocable doubt on such a simple formulation of the problem of sickness and the chain of causation.

I became aware of the power of social and cultural forces and their impact on health. In common with most, however, I continued to see cultural factors as encouraging the presence of certain diseases, or preventing an unquestionably effective technology from being brought to bear on the disease problems of non-Western groups. Such an understanding led to the belief that, if Western scientific medicine and technology could be introduced with the aid of social scientists to ensure acceptance by the host culture, the cause of the repeated failures after World War II could be overcome. The Many Farms experiment, started by Walsh McDermott in 1955, and described in Kurt Deuschle's contribution to this volume, was based on this premise. There, high technology medicine was introduced to the Navajo in such a manner that indigenous healing systems and Western medicine coexisted with apparent comfort. It is my belief that the initial results of the research seemed to bear out the premises on which it was based. Individual and community expectations were met or exceeded. The presence of Western-trained physicians fighting the individual illnesses of individual patients was embraced by the Navajo.

When all the data were in, however, McDermott saw it quite differently. In 1972 he published an important paper, "Health Care Experiment at Many Farms,"[18] in which he makes it clear that the fundamental problem in transcultural medicine does not lie in developing the sensitivity to requirements of the host culture that will permit access by personnel and technology, although this is unquestionably vital. Rather, the afflictions of the Navajo (with the important exception of tuberculosis and perhaps otitis media) did not fall within the ken of technological medicine. It is not that 1950s medicine did not have solutions to their major diseases, it is that the major causes of morbidity and mortality of the Navajo do not fall within the system of entities that count as "diseases" in our medicine. In Walsh's term, they did not have "name" diseases. McDermott was struck by the seeming paradox that the personal physician system of

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Western medicine was accepted by the Navajo, but that its technology was ineffective.

> Popular expectations and misunderstandings of what an individual physician can do operate as a formidable constraint on the rational use of biomedical technology. Indeed, because of the nature of medicine, as a practical matter its technology has to be deployed irrationally. This is largely the consequence of our tradition of having both essentials of medical care—the technology and the human support—administered by the same person, the physician.[19]

What was not clear at the time is that the ideas contained in the term "rational use of the biomedical technology" might be in need of redefinition.

We have now come full circle. The phenomenal development of Western scientific medicine was dependent upon the "discovery" of diseases as we know them—entities with a specific cause and a specific location, whether anatomical or biochemical. Where health problems cannot be defined in those terms—such as those used in much of the developing world after the Second World War—scientific medicine is a misfit.

It is apparent, however, that Western medical science has had many successes in Third World cultures. In part, these advances occurred because some of the health problems fit the technology; in part, because of the westernization of these peoples. These are insufficient, however, as explanation. Rather, I believe, an important element has been the fact that medical science *without formal acknowledgement of the conceptual shift* has, itself, become progressively less dependent on disease concepts, pursuing instead an understanding of biological processes apart from specific diseases. Here we have come again to a more "physiologic" concept of disease, ideas that in our time have their origin in the so-called ecological perspective, with which Rene Dubos was closely identified.

Following the war, Dubos, both a friend and a colleague of McDermott, began to write increasingly about the interdependence of organisms and their environment. In perhaps his best known book, *The Mirage of Health*, he demonstrated that in humankind's adaptation or maladaptation to its environment lay the roots of its bodily afflictions.[20] In this view, to see *the* cause of tuberculosis as the tubercle bacillus is a naive interpretation that is not rescued by words

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sent to do the job, such as "necessary but not sufficient cause," "contributory cause," and so on. As inadequate as it is to explain the causes of the infectious diseases in such one-to-one terms, other disease states are even less explicable by the search for specific etiologies. In *Man Adapting*,[21] and then in *So Human an Animal*,[22] Dubos continued to illustrate the constant evolving process that is the life of an individual, a culture, a nation, and even an epoch; and how that process cannot be separated from human biology and the social and cultural evolution that occurs concurrently.

Dubos' work was widely acclaimed and taken up by the environmental movement that swept the country in the late sixties, culminating with Earth Day on April 22, 1970.[23] The goals of the environmental movement entered our society as air-pollution control and the reclamation of natural resources achieved a large political constituency. Public support for environmental reform was based, in part, on a perception by the population that the environment was far dirtier and more threatening than the evidence might support.[24] Americans have continued to perceive their bodily ills to be the result of environmental toxins. They have changed their diets, significantly reducing the amount of meat and saturated fat consumed, and they have even cut down their intake of hard liquor, and alcohol in general. Achieving and maintaining fitness have become widespread values. And the belief has grown that individuals are responsible for maintaining their own health. These changes in behavior and concepts are consistent with an ecological perspective on disease and its causation. It would not be equally true, I believe, to say that the fundamental ecological concepts—the idea of chains of causation and the interrelationship of humans and their environment—have become part of everyday *acknowledged* ways of thought.

COROLLARY CHANGES

It is not an exaggeration to state that belief in the promise of science has been as central an article of faith in twentieth-century America as a belief in God. It is in the light of this belief that the importance of the widespread disillusionment with science of the last twenty years must be seen. In an attempt to come to terms with both the rise of science and its recent disparagement, one must understand that science and technology are related, *but distinctly different*, entities.

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With the exception of the relatively small number who migrated to Maine to live off the land, and perhaps a somewhat larger number who disdain all television, most of the people who no longer believe science will solve all of humankind's problems still love the comfort, convenience, and fun of technology. In this discussion, I am speaking about science as a world view, and *not* about technology.

A brief look at a few of the basic ideas of classical science (those employed by medicine, the social sciences, and known to most citizens) will suffice to show how theory is out of step with the changing ideas of the twentieth century. Descartes' genius was to separate the world into the material (things, objects, the stuff that is "out there") and the non-material (mind, thoughts, emotions, soul). Whatever the origins of the division, it was immensely political and practical. Cartesian dualism allowed science to get on with its work by diverting the attention of the Church, which had no stated interest in the material world, and it immensely simplified the job of science by focusing attention on the measurable. (The division also exemplifies the power of philosophers. The way Descartes sliced the pie became the way Western society saw the world until just recently. It is theory that determines our world view, not the other way around.) Through the centuries, the fundamental theory of science has been modified; but, remarkably, the way objects were considered in relation to each other and to the observer remained much the way Newton saw things as he developed his basic principles. As is well-known, advances in physics over the past century, and particularly since the 1920s, have drastically modified our views of space, time, the relationships of objects to each other and to the observer.

One would not know this from medicine! The technological fruits of this theoretical upheaval are to be found throughout medical practice and research, but technology is not the subject, the subject is the antiquated theory of science that most practicing doctors hold. I learned physics in the 1940s. It was taught to me by physics teachers (not working physicists) who had been grounded in their subject in the twenties to thirties. Little wonder that doctors, who have no practical reason to update their ideas about physics, have old-fashioned notions about the universe, although they live in a world built around a whole new conception of, say, space and time. Classical science believes objects (a chest of drawers, for example, or a person's liver) to be things that occupy space. As long as they exist

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they are considered to occupy the same space. But for science the layperson's word, *volume*, would be the equivalent of the idea of space. Everyday usage borrows from the scientific idea, because, over quite long periods of time, as long as the chest of drawers or the liver are not moved, they are considered to be in the *same* space. This may seem true of the chest of drawers, but unless the person was absolutely immobilized, it *cannot* be true of the liver. Of course what is really meant is that in relationship to other things—the room or the abdomen—the chest of drawers and the liver are in the same space. One must realize, however, that such an idea of objects is a convenient fiction. It is a fiction, which, among other things, excludes time and the observer. If the chest of drawers was first royal blue, and then it was painted red, and then got knicked by a child's tricycle, we say it is still the same chest of drawers. If the person's liver is transformed by cirrhosis, we say it is the same liver. Of course they are not the same, they have been transformed over time—they have a relationship in time to the previous objects of the same name, but they are not the same. In fact, what has remained the same, no matter how much time has elapsed, is royal blue or the quality of liver-ishness—and those qualities we do not even assign the status of objects because they depend on the perception of observers.[25]

Enough. The point is that classical scientific theory and experimental methods based upon it employ an artificial concept of space, cancel out real time, and do not consider the observer part of the system of nature that is being explored. The derivation of such ideas from the early foundations of science is natural enough, and even their application to diseases considered as "things" can be understood. But such notions are at wide variance with a system of medicine based on an understanding of pathophysiology. There, what is considered is the change of the organism through time—process. And pathophysiology, in the most modern understanding of it, extends beyond the boundary of organ systems to include patient-initiated and environmental influences on the process. In such views of pathologic processes, space, time, and the observer become parts of the system.

And this, of course, is the view of the universe that quantum physics has embraced for half a century. But ideas about the nature of reality change slowly. Whitehead gave the lecture cited above in 1919. The body of his work, which, I believe, contains the concep-

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tions of nature most applicable to modern medicine, was written in the late twenties and thirties. But changes in one's conscious notions about such matters do not tell the whole story. There must be consequences for medicine if some of the technology of medicine and day-to-day life—including nuclear power, nuclear weapons, and space exploration—is based on a different set of ideas from those embraced by an individual when thought is given to the matter. For laypersons the matter may be as simple as being happy with the medical technology and dissatisfied with medicine. For doctors immersed in the intellectual paradoxes, coherence is further strained.

THE MIND-BODY PROBLEM

There is hardly a patient today who does not believe that the mind has an effect on the body. Large numbers believe that most illnesses are brought on by inner conflicts of which the patient is unaware. Many physicians, at least for themselves and their families, act as though they hold the same ideas. These notions differ from the conceptions of causality quite common through the ages, embodied in phrases like, "he died of a broken heart." Indeed, over the last fifty years there has occurred one of the most striking changes ever in the commonly held conception of the nature of persons. This was the development of rich notions about the interior life of individuals. Where Freud's early writings were ridiculed by many, there has grown an almost universal acceptance of the existence of unconscious motivations, the influence of early childhood experience on adult behavior, and the idea that these aspects of the interior life of the mind can have specific effects on the body. In addition, recent decades have seen American culture legitimate sexual needs, as well as needs for love, nurturance, happiness, and even the expression of emotions such as anger. In these regards, parents are held answerable, even publicly, for how well their children are raised. That is, the interior life of the child is considered by many to be the parents' responsibility. In addition to these decidedly new notions, people are expected nowadays to take some responsibility for their own health, through exercise, nutrition, the control of personal habits, such as smoking, and so on.

The fact that both doctors and patients share these beliefs is probably demonstrable in almost any American doctor's office every

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day. All of this is decidedly strange, because medicine does not really accept that there *is* a mind. Doctors believe—at least it is one of medicine's fundamental concepts—that all of the constituents of the body (cell-membranes, mitochondria, cells, organs, and even combinations of organs like the nervous system and sense organs) are controlled by the random laws of nature. Certainly these cells, parts of cells, and organs are considered to have no control or responsibility for their own actions. But when all the parts are collected into persons, persons are considered responsible for their actions, and even for the development and behavior of their children. Either persons are collections of randomly acting molecules or they are responsible. Without some serious modification of one or another of these ideas, they cannot coexist without creating difficulties. This problem has been present since the beginning of science, but has become more acute in these last two generations as the whole idea of mind-body separation has begun to crumble. For doctors, especially, the paradox has been heightened by the fact that the public holds them increasingly accountable not merely for what happens to the patient's body, but for the "whole person."

THE SOCIAL RESPONSIBILITY OF MEDICINE

It would be an error to attribute the source of the social medicine movement to the decades after World War I, because, already in 1848, while studying the prevalence of typhus in Silesia, Rudolf Virchow had become an outspoken believer in the idea that the origins of many diseases lay in the social conditions of the populace. Nonetheless, in the United States, despite the earlier contributions of the public health movement, social consciousness in medicine did not begin to flourish until the decades after World War I. The disease burdens of the poor, immigrants, and workers were seen by many to be the direct result of social conditions, which medicine should be active in remedying. These beliefs were stimulated by what appeared at the time to be the great success of the Russian social experiment. On a more mundane level, the social medicine movement of the 1930s contributed the "social history" to what is meant to be elicited when the history of an illness is obtained from a patient. Third-party insurers such as "the Blues" had their origin in that era as did the group health movement. The Health Insurance Plan (HIP) of New

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York, one of the earliest such groups in the United States, was founded at that time. An enduring belief on the part of many physicians, that medicine had a basic part to play in social progress beyond the mere treatment of individual illnesses, can be seen in the development of some academic departments of public health and preventive medicine. The role of medical schools in these activities, however, was probably not central. Indeed, it would be an error to suggest that the profession was of one mind about extending medicine's functions to include social melioration. Battles erupted, as each step in the direction of health insurance or group medicine was opposed by "organized" medicine (largely composed of local medical societies and the American Medical Association). The rallying theme of the opposition was the spector of "socialized" medicine and the intervention of the federal government.[26]

Many of these new trends seemed to disappear, defeated by the Great Depression and the all-consuming effort subsequently required by the Second World War. But then again in the turbulent era of the 1960s, the idea of medicine's social responsibility burst forth with a fervor that may be difficult to remember in these quiet times. As Robert Ebert points out in his essay on medical education, medical student activism focused on demands that medical school curricula become "relevant" to the needs of the poor and the "oppressed." Medical schools were urged to become involved in the health problems of their communities. As a result, in many schools, Departments of Community Medicine replaced what had been Departments of Public Health or Preventive Medicine. Money for all of these efforts was abundant as part of the federal government's commitment to a "War on Poverty"—a war in which medicine played a major part.

The money ran out, preempted by the Vietnam War. By the mid-seventies the fervor again subsided. But during this period, the relationship of Americans to doctors and medical care changed (as discussed in the essay "Changes in the Concept of the Ideal Physician"), and did not return to where it had been when the activism died down. But what did *not* die—and what was an inevitable outcome of the ferment within and in opposition to the social medicine movement through all of these decades—was the growing belief that disease could not be understood completely apart from the social setting in which it occurred. If the poor have more disease than

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the comfortable, if their illnesses are more severe—both well-known phenomena—then the social setting in which disease occurs must influence its origins, course, and treatment. While this conclusion may be obvious, and may well have influenced the behavior of most physicians throughout history, the facts imply a difficulty in still believing that diseases are simply entities that occupy a body. Over the years, it has become clear that the reasons the poor are more heavily burdened by disease than the comfortable are not always so easy to identify as malnutrition or poor housing—notions that seemed reasonable in the 1930s. Once the successes and failures of the War on Poverty, and community medicine "outreach" programs were tallied up, it became apparent that the increased prevalence of disease among the poor could not be seen in such simple terms—poor housing, lack of education, inadequate medical care, breakdowns in family structure, and other features of poverty all seemed to play their part in a complex manner. Indeed, it is possible to see these factors associated with ill health, as part of the dynamic interplay of other social and economic components that determine the "health" of, for example, the urban social unit in a larger sense.[27] Unfortunately, in the present era of conservatism, the failures of the aggressive approach of the sixties and seventies to the associated problems of poverty and sickness have been taken as a warrant for the retrogressive and simplistic notion that it does no good to give help directly to the weak in society—the poor, the aged, and the sick.

THE RISE AND FALL (AND RISE AND FALL) OF NEW CONCEPTS

It has been possible to identify several intellectual conflicts that are crucial to medicine and that have been important during the last fifty years: first, the conflict between the physiological and the ontological view of disease; second, the conflict of the ideas of the social medicine movement with those whose understanding of medicine and medicine's mission were narrower; and third, the conflict between the ecological viewpoint, in which disease is believed to arise from the interaction of organism and environment, and the perspective that sees a disease as complete in itself. These sets of oppositions seem clearly related, with their differences being primarily ones of setting and scale. In each instance, the contrast is between understanding

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diseases as fixed entities, almost static forms, or understanding them as processes that unfold, with their toll being the human malfunction by which individuals know themselves or are known by others to be unhealthy. In the ontological versus the physiological view, the setting is the body or person; in the social medicine conflict, the setting is the society; in the ecological outlook, the setting is the environment, physical as well as social. The historical progression seems to be from the more structured to the more process-oriented undertanding. It would seem to be more accurate, however, to say that, in the last fifty years, the dynamic viewpoint became prominent, only to recede again into the background. I suggested earlier that these ideas seemed well on their way in the 1930s, only to drift into obscurity until the fifties. They reemerged in the fifties, and the current political and medical atmosphere suggests that they have again receded. It is the long span of time during which these ideas and events have unfolded that makes interpretation difficult. But it is precisely the span of time involved that makes us know how fundamentally important the changes are.

It is instructive to read about the era after the First World War in the 1929 edition of Garrison's *Introduction to the History of Medicine*:

> The period is one of endless mechanical inventions which save labor but destroy leisure, in which the masculine role superimposed upon women during the war was carried over into peacetime, period of Angstrom units, synthetic clothes, shoes, food, drugs, and biological products, of micro-music, television, medical and hygienic *rundfunksprachen*, medical consultations by wireless at sea, aero-transportation, health insurance, illegitimate parents, paternity tests, artificial rejuvenation, mercerized silk, paper socks, shirts, and napkins and other advantages of the levelling effects of machinery. As we enter the machine age, the salient fact about medicine is the trend towards *socialization*.[28] (Emphasis in the original.)

Garrison proceeds to discuss the move toward social medicine, health insurance systems, compulsory panel practice, the concern with preventive medicine, increasing public involvement in medicine, and other familiar-sounding concerns. The following paragraph emphasizes the contemporaneity of the ideas:

> The medicine of the future is beset by the pitfalls of mass-production, commercialism, newspaper exploitation, the soullessness of corporations,

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the deification of corporations, the conflict between group medicine and specialization, the natural lawlessness engendered by complex regulations and regimentation, the periodic flights into mysticism to which the human mind is liable and the human tendency of patients to flock to quacks and cultists when orthodox medicine, and above all, its many specialists, fail to help or to heal. But the signs of change are everywhere apparent.[29]

As noted above, the signs of change that were "everywhere" when Garrison wrote at the end of the twenties were extinguished by the disaster of the Great Depression followed by the Second World War. After the war, change was, in truth, everywhere. Empires tumbled and the parade of new nations began that continues to this day. The democratic ideal spread around the world (despite the fact that many decidedly undemocratic governments have ruled in the name of democracy). Economics and business became international in an unprecedented manner. But what spread even faster was technology—including medicine's new technology of cure, appropriate or inappropriate. In this climate of science and technology on a grand scale, in a world filled with human aspirations, certain fundamental principles have greater survival value than others. The old ideas of science, with no place for those aspects of nature that are particularly human, will inevitably change as science strives to regain its central place in the hope of humankind. Humanity is marked by a respect for the past and an anticipation of the future. It is shared beliefs about the past and the future that hold cultures together. And in this century, as never before, humanity is also bonded together by individual strivings and the values of freedom and happiness. As science changes, so too must medicine—so tightly bound together have they become. But, as the historical values of medicine's devotion to the care of individual sick persons reassert themselves, then medicine will become a further catalyst in the evolution of scientific thinking.

Technology complicates the matter. The trend in medicine and science toward understanding complex systems, toward seeing the world of humans and nature as one of constant change—process—rather than as a world of objects and events in static space, is, strangely, contradicted by technology. The values inherent in technology are straightforward to the point of being simplistic. Think of learning to use a computer as you read this (although it is as true for a food-processor). Technological devices, like tools since the beginning of time, are extensions of the person. But modern technologies

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demand an unambiguous and non-metaphorical compliance with their rules of use if one is to employ them to the advantage implied in their invention. Alas, ambiguity and metaphor are what distinguish us from the inanimate and allow us to live together. Thus, as the human spirit seems to strive toward a richer view of nature, our love of technology turns us constantly back toward the simple. This is not necessarily so, but merely a matter of the time required for a sophisticated people to accommodate to these newer tools. Even if with difficulty, as most people ultimately learn to turn away from a television screen, so too will medicine ultimately become master of its technology.

This is written at a time when fundamentalism seems dominant in the world, and the United States has turned toward conservative views. The dominant values in medicine at the moment are commercial, with medical care viewed as a commodity and physicians as captive purveyors. The ideals discussed here are difficult to discern. Examining the conflict between the two views of disease, the ontological versus the physiological, may seem strangely out of place at this time. But the ideas are of real and lasting importance because they influence the scientific study of disease as well as its treatment. More importantly, they are a part of a larger change in the manner in which humanity views itself and its relationship to nature. The history of this century tells us that the force of this change in fundamental beliefs may be temporarily obscured, but will not be denied.

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Edwin D. Kilbourne

The Emergence of the Physician-Basic Scientist in America

THE PHYSICIAN-SCIENTIST HAS ALWAYS been with us. He is not an invention of Rockefeller philanthropy, German laboratories, or NIH largesse. He is Andreas Vesalius insufflating the lungs of dogs and Theodore Schwann developing the concept of the cellular organization of living things. Through history he has been spurred and seduced by the problems of disease to pursue the inquiry into the elementary nature of things that we call "basic science."

Much is made of the dichotomy of clinical practice and clinical investigation as antipodes of art and science. But the physician, whether brilliant or incompetent, employs the methods of science in his diagnostic approach to every patient every day, and increasingly he is involved in the technology and trappings of science. But he is not a practitioner of science unless he makes new observations, puts them in context, and arrives at new truths and principles. And unless his studies of disease enhance biological knowledge in general, I suppose he is not a physician-basic scientist, even though his venue may be a basic-science department. Given these self-imposed, arbitrary constraints in defining the subject of this essay, I propose to look at who and what the physician-scientist is and whence he came.

VANTAGE POINT—A PERSONAL PERSPECTIVE

My medical school class at Cornell in 1941 harbored a few intense young men and women who knew from the beginning that they wanted careers in medical research, and they seemed to know exactly

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how to go about it. I was not one of them. I lived my life in Osler's "day tight compartments" only because, with no family background in medicine, I found each day a bewildering adventure in a somewhat stressful journey. But provocative teachers stood out as islands in a sea of anatomical minutiae and enzymatic reactions: William Dock in pathology, pioneer in dietary prophylaxis for heart disease—"Man is the only animal who walks on two legs and makes love face to face"; Eugene Du Bois, physiology, famed for calorimetric studies, on taking the temperature of an elephant—"You follow the animal around until it defecates, then plunge the thermometer into its feces."

The delights and excitement of the clinical years brought contact with John Dietrich, Harold Wolff, and Walsh McDermott. Dietrich was the ascerbic but twinkling questioner doing bone metabolism studies of the bed-ridden which were to anticipate problems in space flight. And Wolff and McDermott were my first mentors in research. These two fascinating, wholly different men investigated different things in different ways. In my brief collaboration with Wolff and his research subject "Tom," who had a conveniently accessible gastrostomy, I played the role of latter-day William Beaumont, measuring color changes in the stomach mucosa with a drug house hemoglobin chart! The measurements may have been somewhat subjective, but conclusions on the effects of emotion on gastric circulation were no less valid.

But interested as I then was in the emerging field of psychosomatic medicine, my observations with Walsh of the progressive immobilization of the spirochetes of syphilis in patients treated with penicillin committed me thereafter to the problems of infectious disease. Walsh made this tedious task of dark field microscopy in the "Medicine L" clinic of New York Hospital an adventure, and I was, from then on, hooked by the man and the quest. When in postwar 1948 I joined Frank Horsfall's laboratory at the Rockefeller Institute, Walsh McDermott had opened the door. Walsh, limited in bench training but in nothing else, knew that intensive laboratory experience would be essential for young investigators in the medical schools of the approaching fifties.

If 1948 was a pivotal year in my small world, it also had important implications for other aspirants to medical research. In that year Congress established the National Institutes of Health as a consolidated entity, a year after authorization for a Division of Research

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Grants to provide federal support for extramural research. Four years earlier a modest paper in the *Journal of Experimental Medicine* on pneumococcal transformation with DNA that was to revolutionize twentieth-century biology and medicine had been published from the Rockefeller Institute by McCarty, MacLeod and Avery. In 1950, a Harvey Lecture by W. T. Astbury diffidently cited "molecular biology" as a term "passing now into fairly common use."

Although I was aware of my good luck in being accepted at Rockefeller, it was not until years later that I appreciated the cardinal role of the Institute and its unique hospital in the development of medical science in the United States. My world was a total immersion in research and reading. If sleep was occasionally disturbed, it was not by a call from the emergency room, but by the dictates of an experimental protocol of which I was the author. Horsfall counted himself an Avery disciple in his permissiveness with new arrivals. I was given a slide rule in this introduction to quantitative biology, an enormously skilled and tolerant technician, and time to blunder. His approach contrasted with that of chemist Henry Van Slyke, whose fellows were rigorously instructed in the "gas machine" before proceeding to specific problems in research. The end results of both preceptorial methods were comparable.

Around the breakfast table in the Rockefeller Hospital dining room in 1948 sat khaki-panted, shirt-sleeved young men in their late twenties and early thirties. Superficially similar in phenotype, all were fresh from residencies at leading hospitals, almost all were unmarried, many had been seasoned by wartime experiences—medical and otherwise. They were to go directly from their scientific apprenticeships with Horsfall, McCarty, Lauson, Dole, Archibald, and Kunkel (he seemed one of us) to full or associate professorships, or to more gradual ascendency on the ladder of the Institute. Individually and variously these men would contribute significantly to the understanding of parkinsonism, to basic immunology and virology, to the role of salt in hypertension, and lipid metabolism in human atherosclerosis.

There was no room at the breakfast table for pretense or appeal to authority. As clinicians, we could not blame the laboratory—we were the laboratory. As physician, I recorded the symptoms of my colleagues during an epidemic of unknown cause in the summer of 1948; as investigator I collected samples of blood and throat washings and inoculated appropriate experimental animals to identify the

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cause of this disease as one of the newly discovered Coxsackie viruses. As laboratory scientists, the direction of our research depended on the accuracy of our clinical perceptions. In the hospital world I had just departed there were clinicians and "lab men." (Even today there are so-called clinical investigators who hire Ph.D.s to do "the work.")

The crucial lesson for us was the dissolution of categorical barriers. Laboratories and departments at the Institute were designed *ad hominem* around the interests of the laboratory head. The catalogue of the Institute squeezed the disparate activities of the laboratories of Vince Dole and Henry Kunkel under the heading of "Metabolic Diseases," but people came primarily to work with these men and secondarily to work on hypertension or liver disease. Although I have since learned that the Institute was not immune to jurisdictional and boundary disputes, my own experience was unimpeded by such problems. Indeed, the lesson seemed to be, "go where the problem takes you and do not be limited by the technology." If influenza virus provoked an increase in allantoic fluid protein in the chick embryo, go to Gerty Perlmann in physical chemistry for aid in characterizing the protein.

When Pete (Edward Hamlin) Ahrens, Jr., fresh from a chief residency in pediatrics at Babies Hospital, returned to Rockefeller to study serum lipids, he joined Lyman Craig's laboratory to apply the new technique of counter-current distribution to his problem. No barriers.

If I focus here on the Rockefeller Institute and its Hospital, I do so only because I was privileged to know it at first hand, and because at that time its development had spanned five critical decades in the emergence of the physician-scientist.

STUDY OF DISEASE AS AN ENTRY POINT INTO BASIC SCIENCE—THE PECULIAR EDGE OF THE M.D. IN RESEARCH

In everyday life, sight of the abnormal reminds us of the normal human condition. Similarly, the physician defines normalcy by its deviations (polyuria, oliguria), while the experimentalist induces perturbations in normal systems. But "nature presents bolder experiments than one would ever dare perform."[1]

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Notably, the empirical therapy of nutritional deficiencies such as scurvy has defined the role of vitamins in the maintenance of normal health. When Garrod was confronted with the black urine of alkaptonuria and its familial occurrence, he was led to recognize other inborn errors of metabolism and to establish the field of biochemical genetics.[2] Most dramatic are the effects on normal physiology of ablation or impairment of the endocrine glands. James Howard Means stated that, "By their diseases ye shall know them."[3] Noting also that, "since medicine is older than even physiology or biochemistry it is not surprising that the earliest discoveries were made in the realm of clinical practice," Means points out that Banting's discovery of insulin "provided an agent that not only gave diabetics a new lease on life, but placed in the hands of investigators a new tool with which to explore the oxidative mechanisms of the body and the metabolism of glucose." Francis Moore has made the interesting point that the contributions of Vesalius as a medical school teacher to the "pure science" of anatomy had far greater influence on the growth of biological sciences than those of Leonardo born only fifty years before but remote from medical practice.[4] Thus, the practical application of discovery in a medical atmosphere may be no less important than the initial revelation.

Wisdom is not often found in catalogues, but the 1946–1948 catalogue of the Rockefeller Institute, describing the activities of the Hospital, put it this way: "It is considered important that the physicians caring for the patients shall themselves engage in these [laboratory] studies, since not infrequently careful observation of patients yields suggestions for lines of research which might otherwise be overlooked."

INTELLECTUAL FOCI—THE EUROPEAN CONNECTION AND THE BEGINNINGS OF AMERICAN SCIENTIFIC MEDICINE

How many centuries, indeed, had the practice endured of putting drugs of which the doctor knew little into human bodies of which he knew less![5]

The role of William Henry Welch in the development of American scientific medicine cannot be overestimated. His recruitment of

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brilliant faculty to the newly founded Johns Hopkins Medical School in the last decade of the past century depended on a perception of medical education that would require "ingenuity in the device of new methods and of apparatus . . . a profound knowledge of physics or of chemistry or of mathematics . . . and . . . well-developed faculties of logical inference and of wide generalization."[6] All this implied that teachers of medicine should be scientists, or at least scientific in outlook. But, except for the isolated vigils of William Beaumont and a few others, there was little tradition in the United States of scientific medicine at the turn of the century. Indeed, the experimental medical sciences were newly emergent in Europe at just that time in the laboratories of Koch, Golgi, Laveran and Ehrlich—physician scientists, all. Physicians, challenged by disease, were developing the basic techniques and methods for the cultivation of bacteria and the staining of diseased (and normal) tissues.

Welch had journeyed to Europe and immersed himself in European, and especially German, scientific culture; he had worked in laboratories in Strasbourg, Leipzig, and Breslau. He brought back not only laboratory experience and training, but the new concept of laboratory-based clinical investigation. He had learned also that significant research required full-time commitment and adequate personal compensation so that a medical school professor would not need to seek practice to support himself.

If the most direct influence on the establishment of scientific medicine in the United States was the training of young physicians in the laboratories of German universities, this does not belie the enormous influence of Claude Bernard and Louis Pasteur in France. However, as Hans Zinsser has pointed out in his autobiography,[7] their influence reached America indirectly through the German universities because these primary developers of experimental medicine had little time for foreign students. The prototype of the American physician-scientist is nowhere better presented than in Zinsser's description of the German professor of the 1860s who had "... gained his position by research. He was far more than a teacher—rather, the leader of a school of investigation and thought, whose authority was derived from his contribution to knowledge and his ability to guide his pupils into channels of productive observation."[8]

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By the 1880s, American disciples of Koch, Ludwig, and Cohnheim were bringing concepts of scientific, and more importantly, *experimental* medicine to university-sponsored medical schools in the United States. It remained for the catalytic effect of Johns Hopkins Medical School to initiate a golden age in medical science and the beginning of American supremacy in medical research.

THE SCRATCH ON THE GLASS AND THE CRYSTALLIZATION OF INTELLECT

Scratch the inside of a beaker containing a saturated solution, and invisible molecules will crystalize. Similarly, the establishment of the Johns Hopkins Medical School by the legendary Osler, Halstead, Welch, Mall, and Abel revealed a latent pool of American talent, as brilliant students were attracted to a school with well-equipped laboratories and full-time teacher-scientists. Eugene Opie, William MacCallum, and Rufus Cole were admitted as transfer students soon after the school opened. Opie, whose productive investigations were to span seven decades, was initially rejected! It is both reassuring and chastening to consider the quality of students who flocked to Hopkins, Harvard, Yale, and Columbia soon afterward, once the proper environment for scientific medical training was established. Where were America's potential physician-scientists? They had been there all the time. Where are they now? Still here, I am sure, but struggling to pay tuition costs, buried in paper, put off by the demands of high technology, and increasingly deprived of role models.

THE INSTITUTES—A NEW WAY OF LIFE

With the founding of the Rockefeller Institute in 1901 as a free-standing institution for the conduct of non-categorical medical research, medical scientists were provided with a nirvana of personal financial security, laboratory facilities, and time unfettered by teaching duties. All this was secured by enlightened private philanthropy, which was soon emulated by the establishment of the Carnegie Institution in Washington and institutes with more limited objectives such as the Phipps Institute in Philadelphia. Again, America had

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seized upon European invention and in some ways improved on the European models exemplified by the Pasteur, Koch, and Lister Institutes. Flexner notes, however, that the Kaiser Wilhelm Institute, founded in Berlin in 1911, was based on the Rockefeller Institute and the Carnegie Institution![9]

But never did the new institutes become intellectually or socially isolated from the mainstream of American scientific medicine. In fact, as research became more technically demanding, they served as training grounds for future professors of medicine and pediatrics who had learned to converse freely with the physicists and biochemists with whom they lunched daily. It was not propinquity alone that fostered this invaluable communication. Rather, it was an absence of constraining responsibility, a sense of common objectives and an excitement in their pursuit that made scientists of physicians, and directed non-physicians toward the problems of medicine.

And beyond the walls of the institutes, the societies helped.

COMMUNICATION, STIMULATION, AND REINFORCEMENT: THE ROLE OF THE SOCIETIES AND JOURNALS IN THE NURTURING OF PHYSICIAN-SCIENTISTS

The *Journal of Biological Chemistry*—that enduring symbol of rigorous science—was founded by a physician (Christian Herter); and the *Journal of Experimental Medicine,* current repository of such non-clinical esoterica as papers on immune response genes and helper lymphocytes, by the physician-pathologist-bacteriologist, William Welch. There is little question that the high standards of these journals—epitomized by the editorial dicta of Peyton Rous of the *JEM*—did much to enhance the clarity of scientific communication, as well as to better the science itself.

The founding in 1886 of the Association of American Physicians by men trained in pathology, as well as in medicine, was important in transcending regional barriers. Initial membership was drawn from eighteen cities in the United States and Canada.[10] Moreover, the Association from the beginning numbered bacteriologists and chemists, as well as clinicians and pathologists among its members. As early as 1903 (not exactly a high-water mark in medical progress), it was noted by its president that "the proportion of purely scientific papers had been steadily increasing in number and value."[11] In 1902,

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an eighty-eight page report of "A Study of Bacterial Cells" by Victor Vaughn and associates appeared in the *Transactions* of the Association addressed to a clinician audience. Only a year before, Walter Reed had reported on "Experimental Yellow Fever." From the first this "Association of . . . Physicians" was not only attentive to science, but was its promoter.

The meetings of the Association, together with its daughter and granddaughter societies, the American Society for Clinical Investigation and the American Federation for Clinical Research, not only augmented the economy of pre-casino Atlantic City, to which members annually migrated like wild fowl, but breached geographical and institutional barriers to facilitate communication among physicians conducting medical research.

MONEY—TOO LITTLE AND TOO MUCH

The salutory effect of money on the promotion of basic medical research and the nurturing of physician-scientists had been dramatically demonstrated by turn-of-the-century private philanthropy. It is probably significant that this early support had few strings attached and placed little emphasis on the solution of specific diseases or problems. But it is interesting that as early as 1936 Robert Loeb, then president of the American Society for Clinical Investigation, decried the effect of "apparently unlimited financial resources" in promoting the expectation that "the mysteries of medical science must bow before the concerted onslaught, and bow promptly."[12]

I may seem to digress at this point if I do not distinguish between the primary effects of monetary support on development of basic medical science and the secondary effect on the scientist. Prodigality is not necessarily destructive, yet even in the thirties Loeb was concerned that medical students without "Geist" or other qualifications would be encouraged to enter laboratories.[13]

Megabuck research began during World War II with the pragmatically oriented support of medical research by the Office of Scientific Research and Development (OSRD) of the federal government, implemented principally through the National Research Council. Joseph Means[14] has pointed out the importance of the "D" in OSRD, with its emphasis on the rapid applications of science. Influenced also by the disease-oriented commissions of the Armed Forces Epidemi-

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ological Board, a pattern of support for categorical research was established that has strongly influenced federal support ever since.

The post–World War II explosion of research activity, fueled by federal dollars, began with the establishment by Congress of the Division of Research Grants in 1947 and its amalgamation into the NIH the following year. The accessibility of federal funds provided by grants and fellowships made "research" a popular alternative to practice for many young physicians. Something called "clinical investigation" burgeoned as a result. Although it is probable that this financially based democratization of science had favorable effects on medical education and practice, it seems unlikely that the availability of grants was *the* critical factor in the recruitment or sustenance of physician-scientists, many of whom were already destined to become career investigators. A British study suggests that half the "medically qualified" researchers were intrinsically motivated by a specific research problem to enter research. This stimulus was secondary only to the influence of a teacher or other mentor in determining their career choice.[15] (Shades of Walsh McD!) But it is noteworthy that Mammon is circumstantially linked to success in that the NIH has supported the work of sixty Nobel laureates prior to their awards. It is true that intramural research programs in the NIH thrived during the Korean and Vietnamese Wars, but this very fact must raise some question about motivation for research careers. The definitive scientist is neither easily persuaded to, nor dissuaded from, his career. While money makes everything easier, and even some things possible, it is only the catalyst, not the pheromone of scientific invention—a matter discussed further, below.

IS THE PHYSICIAN-SCIENTIST OBSOLETE? (AND IF SO, DOES IT MATTER?)

It is clear that more and more research in medical science is conducted by investigators without medical degrees. On a personal note I can say that, when I established my medical school Department of Microbiology in 1969, I found that I had recruited five scientists who were physicians, and five who had Ph.D. degrees. Ten years later the ratio had changed so that only two of us with M.D. degrees remained. My recruiting had sought no particular balance of M.D.s and Ph.D.s—rather it reflected a shrinking pool of M.D.s willing to

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accept basic science level faculty salaries and my efforts to secure the best qualified research scientists in a period of increasing technical complexity. The bestowal of NIH grants has followed the same pattern.

Efforts have been made to stem what is viewed as an undesirable trend. The recently established Lita Annenberg Hazen Award for Excellence in Clinical Research not only rewards outstanding physician-scientists, but provides support for the training of research fellows in their laboratories. For some time now M.D./Ph.D. programs have sought to create chimeric paragons to fill the thinning ranks of physician-investigators. It remains to be seen whether these paragons will, like the child of one apocryphal mixed marriage, end up with the "charm of the Germans and the efficiency of the Italians." But does it really matter? More than half of the Nobel prizes in physiology or medicine since 1970 have gone to graduates of medical school. Are the recent awards to Hamilton Smith, Daniel Nathans, Baruj Benacerraf, Michael Brown, and Joseph Goldstein the end of the line, or a new beginning for the physician in research?

But maybe the problem is in part semantic. Physician-scientists are a mixed lot, ranging from those who disappear into research institutes immediately after medical school, never again to touch a patient, and those whose day-to-day research depends on direct access to the sick. One will, like Peyton Rous, find the clues to cancer in the deformed leg of a chicken; the other, like Garrod, will discern biochemical universality in the black urine of a patient. Both must flourish, and both bring special gifts to their quests.

I do not think that physician-scientists can be recruited, wooed, seduced, or bought. Their lives can be made easier and more attractive in suitable intellectual and physical environments. But they will come to scientific inquiry driven by curiosity—or as David Baltimore, a non-physician, has put it, by a desire to understand. Sometimes, like Avery, their problems will be intuitively well chosen and their point of departure, medical. Thereafter, they are scientists, like any other, with fixed and specific objectives.

Perhaps the future of medical science lies increasingly in the hands of chemists and physicists. Indeed, they may have most of the answers. But the physician-scientist may have most of the questions.

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Robert H. Ebert

Medical Education at the Peak of the Era of Experimental Medicine

IT WAS A SIMPLE MATTER to identify the 1960s as the decade during which experimental medicine peaked, and further to pinpoint 1965 as the apogee of that era. To be sure, research budgets have increased since then, there are more investigators, and more full-time medical school faculty members. Most important of all, there have been spectacular advances in medicine since 1965. Yet something has been lost, and it is best described as the loss of a boundless optimism about the future of academic medicine. In the middle 1960s, all may not have been right with the world, but it was about as all right in the microcosm of American medicine as it had ever been before, or would ever be again. Research funding seemed guaranteed for anyone with a reasonable research project, and there was ample money for research training and for new full-time faculty. A powerful health lobby worked with the Congress to persuade that legislative body that biomedical research could solve the problems of disease and could make us a healthier nation if only it would provide adequate funding for the NIH. Academic medicine had been on a steady upward course since the end of World War II, and the future seemed equally bright. Yet, national events at the end of the decade dampened that optimism, and questions began to be asked about the relevance of academic medicine to the problems of the larger society. Perhaps no decade in this century can be said to have been more pivotal in determining the future of academic medicine, and even the future of the practice of medicine, than the decade of the 1960s.

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This essay is meant to deal with medical education at the peak of the era of experimental medicine, and I will not neglect that topic, but I must warn the reader of my prejudice. I am convinced, and the work of Dr. Funkenstein confirms that conviction, that the medical school curriculum has less to do with the education of the physician than a variety of other factors. The knowledge and skills required by the physician to practice his profession are only one part of medical education. The development of a set of values and principles of professional conduct is clearly another. The question is, how much influence does the curriculum have in the development of the value system, how much comes from the general medical school environment, including both positive and negative physician-teacher models, and how much is the result of external social forces?

Medical educators find it reassuring to believe that what they teach, and the environment in which they instruct, will have the most profound influence on medical student thinking, including how students make career choices. What is fascinating about the decade of the 1960s, at least until about 1968, is that this perception appeared to be true, for during this period there was a greater conjunction of interests on the part of both students and faculty than in almost any other decade in this century. This correlation was particularly apparent in the choice of careers by medical students.

Perhaps the most careful and complete study of career choices has been done by Dan Funkenstein.[1] Over a period of nineteen years, from 1958 to 1976, he did a prospective study of Harvard medical students at matriculation and at graduation, combining information from the admissions committee with the results of questionnaires administered in the first medical-school year and again in the fourth. The questionnaires not only collected demographic information about family background, schooling, and urban or rural upbringing, but sought to determine student values and interests. Questions were asked about why medicine was chosen as a profession and what other careers would have been considered had the student been unsuccessful in obtaining admission to medical school. Finally, the student was asked about the kind of career he would pursue in medicine, and this was done at both the time of matriculation and at graduation. Funkenstein also did a retrospective study of students enrolled in the Harvard Medical School between 1947 and 1957 using material from the admissions committee and registrar's office.

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In 1974 he did a follow-up study of alumni and alumnae who had graduated between 1958 and 1972. He studied a class at the University of Michigan that matriculated in 1969 and graduated in 1973 and finally, in 1975, he studied a national sample of freshmen and senior medical students from representative state and private medical schools. Unfortunately for those who believe there is something unique about a Harvard medical education, Funkenstein found that Harvard students think and behave in much the same way as medical students in other U.S. schools.

Funkenstein began his studies with no preconceived notions, and he did not set out to prove a particular thesis. He was simply interested in what influences medical students in their choice of careers. What he discovered does little to reassure those who are convinced that changes in the medical school curriculum will affect medical student behavior and choice of career. He found that medical students can be divided into two broad groupings—namely, the bioscientific and the biosocial. Students who are classified as bioscientific have high quantitative and science test scores, usually have majored in science, are competitive, and are not particularly interested in people as individuals. In contrast, biosocial students score high in verbal testing, and in general information, are more likely to have taken courses in the social sciences than in the physical and biological sciences, are less competitive, and enjoy interpersonal relations. Classified in this way, students form a spectrum, with the most bioscientific on the left, and the most biosocial on the right; on the far left of the spectrum the bioscientific medical student is most like a science Ph.D. student; at the far right of the biosocial scale, the student is most like a Ph.D. student in the behavioral sciences. Obviously, many students fall toward the middle of the scale, but it is of interest that there is a direct correlation between the general attributes of the biosocial students (as measured by test scores and intellectual interests) and interpersonal relationships. That correlation is not found among the bioscientific students. I shall comment later in this essay on Funkenstein's findings at the start of the decade of the sixties, at midpoint, and at the end of the decade.

Since it is the environment in which medicine is taught rather than the curriculum that influences the thinking and career choices of medical students, I shall devote the remainder of this essay to an account of what happened both within the medical school and in the

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outside world during the forty years between the end of World War II and the present. My purpose is to try to explain why the sixties was a unique decade for medical education. I shall begin with the high hopes and high spirits of the leaders of academic medicine as they viewed the seemingly endless horizon opened by the ever-expanding budget of the NIH during the fifties, the fulfillment in the sixties of much that had been hoped for, and then the decline in aspirations that followed the disruptions of the late sixties and early seventies, ending with the dispirited mood of academic medicine today. I shall reflect on the changing aspirations of medical students, residents, and fellows over the forty-year period, and finally, with perfect hindsight, I shall try to interpret the course of events in terms of what I view as fundamental flaws in our system of medical education.

The first revolution in modern American medical education followed the Flexner report in 1910; the second was initiated by the decision at the end of World War II to make a substantial investment of federal funds in biomedical research, using the National Institutes of Health as the conduit, and the faculties of universities and medical schools as the recipients. The importance of these decisions is worth emphasizing, for they did much to shape the destinies of American medical schools. A decision might have been made to support research exclusively in separate research institutes, but instead it was decided that the university and the university-affiliated hospital represented the most favorable environments for biomedical research. The categorical disease orientation of the NIH required the involvement of teaching hospitals, for it would have been ludicrous to support research on cancer, heart disease, or arthritis without supporting part of it in the clinical setting. Since these same hospitals were dedicated to patient care and teaching as well as research, the financial support of three quite different activities began to be intertwined and for the next forty years it became popular to say that teaching, research, and patient care were so inseparable that it was impossible to account separately for the cost of each.

Finally, a decision was made that was to create a schism between faculty members receiving research support and the administrators of the institutions in which faculty worked. Stated in the simplest terms, it was a decision to support individual faculty members and *not* institutions. It was a decision based on the conviction that universities and teaching hospitals were guilty of exploiting full-time faculty

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members by requiring long hours devoted to teaching and/or patient care with only a little time, begrudgingly given, for research. In effect, the NIH was telling universities, we will deal directly with your faculties, we will buy time for research and research training, we will give universities something in payment for overhead, but the NIH—not the universities—will do all of the monitoring of grants and will do this on a one-to-one basis with members of your faculty. Thus, faculty members receiving NIH grants became responsible to two authorities, the university/university teaching hospital and the NIH.

In the late forties and early fifties, a few senior members of medical school faculties dared to ask whether or not major NIH support of research was an unqualified good. They questioned the desirability of too much support from government and asked their colleagues to think what it would be like to have the federal government in control of private medical schools. These critics were in the distinct minority; their arguments were declared simplistic; they were accused of being antiscience, antigovernment, and against progress. Finally, their voices became so faint that their message was completely lost in the noise of the applause from the majority (myself included), who rejected any argument against more and larger grants for research and research training. There was no debate, there was no planning, and no thought was given to the consequences of a profound change in the way medical schools would be financed. It became a matter of faith, rather than reason, that only good could come from the support of biomedical research and that more was inevitably better. The second revolution was launched and medical schools welcomed the change, but with almost no realization of how profound the change would be.

Who were the people who were in positions of authority when the revolution began and what were their dreams? There were some towering figures in American academic medicine at the end of World War II despite the fact that the medical education establishment was relatively small, and I will mention only a few who are representative, and who, directly or indirectly, influenced my own career. They were men like O.H. Robertson, C. Philip Miller, and Lowell Coggeshall at the University of Chicago; Joseph Wearn at Western Reserve University; Cecil Watson at the University of Minnesota; William Castle, Max Finland, Walter Bauer, Herman Blumgart, and George Thorn at Harvard; Francis Wood at the University of Pennsylvania; and

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Robert Loeb at Columbia. These were men who saw NIH funding as a means of making medical schools, and particularly teaching hospitals, truly academic. They were ready to harness the power of NIH funding to enhance the research enterprise in their own institutions and to provide academic opportunities in other institutions for those residents, fellows, and junior faculty whom they were unable to keep. It was an expansive period in the late forties and fifties with numerous choices for the best and the brightest. These were the young men, and a very few women, who had been trained in the best research laboratories, who had been nurtured by their mentors, who were selected for the American Society for Clinical Investigation, and finally were placed in appropriate academic positions, often in institutions without long academic traditions. Some worked in the laboratories at NIH, some became department heads, some became the heads of specialty divisions, and all, or almost all, looked to the advancement of biomedical science as the Holy Grail.

This new breed accomplished much. They enjoyed building their departments or divisions, they communicated some of their excitement to their students, residents, and fellows, and, at a relatively early age, they were able to enjoy a collegial relationship with their peers in other institutions by travel to meetings, site visits, and study section assignments made possible by NIH funding. It was a heady kind of environment, conducive to optimism about the present and almost unshakeable faith in the future. By 1960, the revolution had been completed, and the reins of power in academic medicine had, for the most part, been passed to this younger group, eager to fulfill the dreams of those who had trained them.

Since the burden of this essay is to deal with the medical education of the 1960s, let me now try to fulfill that mission, having set the stage by describing some of the events that went before.

The nation's mood at the start of the decade was one of optimism. The election of President Kennedy seemed to herald a new era of youth and vigor and there was the general feeling that as a nation we could accomplish almost anything we set out to do, including landing a man on the moon by the end of the decade. The shock of Sputnik in the fifties caused the nation to reexamine its educational system, and by 1960 efforts were well under way to improve scientific education. There was renewed faith in science and research, and most supported the view that money spent by the federal government on

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biomedical research was money well spent. It was a period of relative peace, and the missile crisis in Cuba served only to strengthen the nation's confidence. The assassination of President Kennedy came as a bitter blow, but the nation's stability was evident in the relative ease of transition to the presidency of Lyndon Johnson.

In retrospect, it is remarkable what a progressive and expansive mood prevailed until almost the end of the sixties. The Civil Rights movement was well underway by the time Lyndon Johnson was elected president in 1965, and he declared War on Poverty as a part of his program for the Great Society. He was a consummate politician and, notwithstanding violent opposition from organized medicine, he was able to persuade Congress to pass legislation creating Medicare and Medicaid. These two entitlement programs, probably the most important pieces of health legislation to be passed during the century, gave further support to teaching hospitals. Nor did public support of social programs in any way diminish public faith in biomedical research. By mid-decade, there was some expression of discontent about overspecialization and the disappearing family physician, but not enough to alter the support of Congress for the NIH. The only question asked by Congressional committees with an overview of NIH was—what could you do if you had more money? By the mid-1960s, medical schools and teaching hospitals had every reason to be optimistic. Research and research-training funds were plentiful, and now Medicare and Medicaid would pay for much of what had been charity care.

In another essay in this volume, Paul Beeson describes the evolution of strong subspecialty divisions within departments of medicine. I will try not to be repetitious, but I need to make a few observations about subspecialization in order to document what I have to say about the academic environment in medical schools during the sixties. There is what I would call the demonic theory of subspecialization that accuses academic medicine of deliberately perverting the practice of medicine by substituting cold, calculating subspecialists, interested only in particular diseased organs or systems, for kindly humane family physicians, who are interested in the whole person. The inference is that you will be returned to health in the hands of a family physician, but that you are in jeopardy of iatrogenic illness if cared for by a specialist. Of course this is nonsense, but it continues to have a certain currency. The truth is that specialization and

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subspecialization came about because advances in medicine make both the theory and practice of medicine more and more complex. It has been a very long time since one person could master all there was to know about medicine, and specialization began long before funding by the NIH made possible further advances in biomedical technology. The science of medicine made specialization essential.

Nevertheless, the way in which the NIH funded medical schools also had an important impact on the structure of clinical departments. The organization of the NIH is categorical, meaning oriented to diseases and to organs; therefore, it is not surprising that both research and training programs should evolve in support of subspecialties such as cardiology, gastroenterology, endocrinology, and cancer. Monies came directly to subspecialty divisions and to individuals in those divisions so that the schism in loyalty between the NIH and the university or hospital or even clinical department was inevitably accentuated. It was the divisiveness of NIH funding, and not the evolution of subspecialty divisions, that caused a problem.

Many of the research training programs sponsored by the NIH included clinical experience in a subspecialty as a legitimate adjunct to training for research, it being argued that clinical knowledge of a field was essential if one were to engage in clinical research. Training programs multiplied during the sixties and the best of these trained some very good investigators. But others had difficulty recruiting able candidates, and it was generally accepted that many, if not most, of the trainees in programs of mediocre quality would go into practice. Thus, many of the cardiologists, gastroenterologists, and other subspecialists, who were recruited by community hospitals to bring the latest medical technology to these institutions, became full-time practitioners, although ostensibly they had received training to equip them for academic medicine.

With support from the NIH, most university hospitals developed strong subspecialty divisions in the various clinical departments, and this inevitably led to an expansion of subspecialty patient care. One of the outcomes of Medicare for a full-time clinical faculty was the development of clinical practice plans that further contributed to the financial support of divisions and departments.

One is given some idea of the magnitude of the expansion of clinical departments during the sixties by looking at the size of clinical faculties at the beginning and at the end of the decade. Between

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1960–61 and 1970–71, full-time clinical faculty increased by 167 percent (from 7,201 to 19,256) while the number of medical students increased by only 45 percent (from 21,379 to 30,084).[2] Obviously, the size of the clinical faculty had little to do with the needs of medical students, but was related instead to the demands of the research laboratory, graduate training, and the specialty practice of medicine.

Before discussing the impact of these changes on medical education, there is one more important institutional relationship that needs to be mentioned, and that is the relationship of the medical school to the university as it evolved after World War II. The Flexnerian revolution mandated a bringing together of university and medical school, and in response medical schools either created, or made modest additions to, full-time clinical faculties. The numbers were constrained by the limits of university finances and almost all schools were heavily dependent on part-time clinical faculty who did much of the clinical teaching but received no university salary support. With the exception of the University of Chicago, practice plans for full-time clinical faculty were almost nonexistent, and the reward for teaching by the part-time faculty was the privilege to admit patients to the teaching hospital. Funding for research came in large part from private sources, and since research technology was relatively primitive by today's standards, the cost of biomedical research was not great. A relatively few major teaching hospitals mostly in Baltimore, Boston, Chicago, New York, and Philadelphia were engaged in true clinical research prior to World War II, but most of what passed for clinical research in other teaching hospitals consisted of case studies and the description of new surgical procedures.

Against this setting, it is easy to see why funding by the NIH was greeted with such enthusiasm by leaders of American medicine, presenting as it did the opportunity to expand the full-time faculties in medical schools, particularly full-time clinical faculties. Here at last was a source of funding that could pave the way for the culmination of the Flexnerian ideal—namely a medical school fully integrated into the university. It started that way, but ironically, over time, NIH funding accomplished almost the precise opposite.

At the beginning of the sixties, there was still great hope that full integration could be accomplished, but there were beginning to be some danger signals. Medical schools, often incorporated into so-called academic medical centers, were becoming parts of large

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far-flung empires, each dominated by either a single university hospital or consortium of hospitals. These centers not only incorporated medical schools, but dental schools, schools of public health, schools of pharmacy, and schools of allied health as well, and the budget of a single center often exceeded the combined budgets of all the rest of the university. Funding of academic medical centers was largely dependent on outside sources, particularly the NIH, and, toward the end of the sixties, increasingly on funds generated through third-party billings. Third-party payors, including the federal government, reimbursed hospitals directly for inpatient care and these payments, ostensibly for salary support for clinical faculty, often represented double billing on the part of hospitals. In addition, there began to be a larger and larger differential between university salaries in general, and those payed to full-time clinical faculty members. By the end of the sixties the centrifugal force generated by medical center size, fiscal autonomy, and substantial salary differentials began to exceed the centripetal force of academically oriented physicians wanting to maintain close ties to the university; the fulfillment of the dream of a fully integrated medical school/teaching hospital/university was virtually at an end. Some would claim it still exists, but it is a barren marriage at best, and today most would admit to friendly separation if not divorce.

What happened to medical students in the sixties and how did they react to this environment of scientific medicine? Funkenstein's studies have revealed that there are abrupt changes in students' interests and in their choice of careers, and that these changes occur simultaneously among entering students and fourth-year students. Such an abrupt change occurred in 1959. During the 1950s the private specialty practice of medicine held the greatest appeal for Harvard medical students—both on matriculation and graduation. The classes chosen were predominantly biosocial (in 1958, 75 percent were biosocial) and this probably reflected the interest of medical educators during the 1950s in general education as the best preparation for the physician.

In 1959, the interest of students in the science of medicine increased suddenly, and this was manifested in the choice of careers. Subspecialty medical practice was still popular, but now it was combined with the wish to be associated with an academic medical center part-time or full-time. In the early 1960s admissions commit-

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tees showed greater interest in scientific preparation, and the proportion of bioscientific students entering the Harvard Medical School increased to between 50 and 60 percent. There was greater interest in psychiatry among biosocial students, and relatively little interest in primary care among either bioscientific or biosocial students.

Perhaps the only important curriculum change during the 1960s was the emphasis on pathophysiology as an introduction to clinical medicine, and an important by-product of this was the heavy participation of full-time clinical faculty in the teaching of what previously had been considered the almost exclusive domain of the preclinical faculty. Thus medical students were exposed to teaching by clinicians before they entered the clinic, and they were impressed by the theoretical as well as practical knowledge of the basic sciences that these physicians possessed. Further, they could not help but note that important contributions to the basic sciences had come from clinical investigation. In fact, the more that molecular and cell biologists became the popular recruits in basic-science departments, the more medical schools had to depend on full-time clinicians to share the teaching of organ physiology, anatomy, bacteriology, and pharmacology.

The same subspecialists capable of teaching the fundamental science base of their specialties, were also the most visible teachers of clinical medicine. The generalist, particularly the part-time generalist, could no longer compete with the full-time specialist, and "pearls of information" were more eagerly sought by medical students than "pearls of wisdom" based on long clinical experience. Despite the efforts of some members of the faculty interested in general medicine to emphasize the importance of ambulatory medicine, the real action was on the wards and it was this kind of "big medicine" that interested the student. Here he was a member of the ward team, together with the resident staff and, more often than not, a member of the full-time clinical faculty. He learned about the latest technologies, and about the importance of clinical investigation in providing new approaches to diagnosis and treatment. This was far more exciting stuff than anything taught in the outpatient department.

The year 1965 represented the peak of what Funkenstein called the "scientific era" of medical student interest. Academic medicine was looked upon by Harvard medical students at all levels as the most prestigious career they could choose, and now there was a

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greater interest in full-time rather than part-time academic medicine. Students showed almost no interest in the primary care specialties, but psychiatry continued to attract many biosocial students.

Prior to World War II, most internships were taken in community hospitals, and the majority of medical school graduates did not go on to residency training immediately following internships. This all changed after World War II, probably because physicians serving in the armed forces recognized the advantages, including financial ones, of specialty training. Immediately after the war, there was an increased demand for residency training, since both recent graduates and returning veterans were in the pool. By the fifties, that demand had diminished, however, even though most graduates now went on into residency training, and teaching hospitals began to compete with community hospitals for residents. Not only did the teaching hospitals win that competition, they rapidly increased their share of residency positions, so that by 1960 community hospitals without medical school connections were almost entirely dependent on foreign medical graduates to fill their residency positions. Newly created academic centers affiliated themselves with the largest and best community hospitals, thus bringing almost all of the training of American medical school graduates under the banner of the medical school.

By the mid-1960s, teaching hospitals dominated both internship residency training and fellowship training in the subspecialties. In many teaching hospitals, it became common practice to continue with subspecialty fellowship after completing the general internal medicine requirement, although training was usually interrupted by a period of military service. Few outside the medical profession will remember that the doctor's draft continued long after the end of World War II, and many residents were required to interrupt their training after the second or third postgraduate year in order to fulfill their military requirements.

It was possible for a minority of residents to substitute service as public health officers at the NIH for military service. These positions were competitive, but not surprisingly they were filled for the most part by residents from the most prestigious teaching hospitals. At the Massachusetts General Hospital, assignment to the NIH after two years of postgraduate training was jokingly called HMS 7 and 8 in keeping with the designation of Harvard medical students as HMS 1

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to 4 rather than freshmen through seniors. It was not uncommon for men assigned to the NIH in lieu of military service to stay for more than the required two years, and these young physicians in particular often received superb research training. In general, there were three pathways into academic medicine: MD/Ph.D. programs supported by the NIH; assignment to the NIH in lieu of military service; and training in a clinical laboratory in one or another subspecialty division. Well-trained investigators were produced in each of these programs, but if one looks at future success based on the ability to compete for research grants, it is probable that MD/Ph.D. graduates would be at the top, NIH trainees second, and those receiving training solely in subspecialty divisions at the bottom. Since many MD/Ph.D. graduates continued further research training in a clinical subspecialty, they had a double advantage. Whatever the relative merits of these several training programs, in the 1960s the future looked bright for all young physicians aspiring to a career in clinical research. One measure of the popularity of clinical research is the number of MDs seeking postdoctoral research training, and in 1968 that number peaked at 5,419.[3]

In 1979 it had fallen to 1,883. Many have written about this decline and have deplored it. Most have blamed the diminution on the greater competition for research funding that causes careers in clinical research to appear less attractive than in the past. They have also pointed out the increase in the number of postdoctoral fellows and trainees holding Ph.D. degrees during the same period (an increase from 2,232 in 1968 to 3,607 in 1979), and they wonder whether the clinical investigator will ever be able to compete on equal terms with his basic science counterpart given the service demands on the M.D. All of this is true, but I would ask two questions: Is the attrition all bad, and are we providing the very best research training for young physicians interested in clinical research? During the sixties, popularity of academic medicine and ease of funding probably attracted people who had little real motivation for research and often little talent. Chiefs of training programs knew that they would be judged by their ability to recruit trainees, and at times were more interested in extra hands in the laboratory than rigorous research training. This was not true of the best training programs, but some were marginal and deserved to be discontinued. Probably the reduction in the number of postdoctoral fellows holding professional

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degrees represents, in part, a realistic assessment of what it takes to become a really well-trained clinical investigator, able to compete for research funds in today's world. It may also reflect a better understanding of the time commitment that is required if productive research is to be done.

Is research training adequate for the clinical investigator? Certainly it is in the best programs—witness the success of the graduates of MD/Ph.D. programs or those who have spent an appropriate number of years at the NIH or in the first-class laboratory of a teaching hospital. But it must be remembered that research technology is more complex than in the past, and that research obsolescence is likely to overtake the individual who is not given rigorous training. In my view, most training programs for MDs are too short, for it does the trainee no favor to turn him loose before he is capable of independent work. Three years of training is a minimum. The fact is that the best laboratories are still being supported, and continue to provide excellent training. It would be self-defeating to resurrect programs of marginal value.

After that digression concerning research training, let me return to the decade of the sixties. By the mid-1960s, academic medical centers had become the dominant force in American medicine. They not only controlled the selection and education of medical students, but of residents and fellows as well. They set the pattern of practice in the community by training the specialists who staffed community hospitals. They played a dominant role in biomedical research, with almost complete control of clinical research. Teaching hospitals were handsomely supported by a retrospective cost plus payment system by third-party payors, and the passage of Medicare and Medicaid insured payment for the hospital care of many who had been medically indigent. Academic physicians became powerful enough so that they no longer worried about town-gown differences, and in the 1960s, began to compete openly with practicing physicians by creating departmental practice plans. Almost everything that happened seemed to consolidate the strength of these centers till near the end of the decade, when suddenly there was a drastic change in the mood of the nation. The Vietnam War had become the most unpopular conflict in the nation's history, and it not only represented a drain on the public purse, but was the source of an even greater drain on the emotions of the country. Student activism on a national

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scale was one of the consequences of war, and for a time it seemed as though the fabric of university life would be irreparably damaged.

The year 1968 was the end of the golden era of the NIH. Not only was the interest of the public diverted elsewhere, there was also the realization that the budget of the NIH could not increase at a rate of 15 percent indefinitely or it would finally overtake the GNP. The Nixon presidency was less sympathetic to research training than previous administrations, and there was increasing public concern for a medical care system that appeared uninterested in providing primary care. The Senate Labor and Welfare Committee decided that there were 80,000 too few physicians in the U.S., and this supplied an impetus in 1968 for the first of a series of health manpower bills that provided incentives to medical schools to increase the number of medical students enrolled and the number of graduates.[4]

Each year that I was Dean of the Harvard Medical School, I met with the entering first year students, and in September 1968 at such a meeting there occurred a small incident that I have never forgotten, for it was to presage a sudden and in some ways frightening change in the medical school. While making some benign welcoming remarks, I was suddenly interrupted by a young woman who demanded to know why she and her classmates had to provide some information asked for by the AMA. I said it was to provide demographic information about physicians in training that added to a national data-base. She responded with some harsh words about the AMA, but the class remained quiet, and I continued my remarks. This young woman had been a student activist at Radcliffe College, and I was to meet her later in Harvard Yard when, in April 1969, University Hall was occupied by the SDS. The sequel to that occupation was the clearing of University Hall by Cambridge Police—an action that was justified, but one that polarized the campus. For practical purposes, the University was shut down as an educational institution till the end of term. One might have expected the distant Harvard Medical School in Boston to be immune from this disruption in Cambridge, but one of the reasons given for the occupation of University Hall was the purchase, by the Harvard Medical School, of housing adjacent to the Peter Bent Brigham Hospital which was to be razed in order to build the new Affiliated Hospital. A medical student body that until April 1969 had seemed totally committed to scientific medicine suddenly changed, and now

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expressed concern for the Roxbury tenants who would be evicted by an oppressive medical school in order to build a teaching hospital remote from the needs of the people. And so began what Funkenstein called the era of "student activism."

My meeting with the entering students in the fall of 1969 was a very different one from those that had preceded it. I could sense a feeling of hostility—or at best—suspicion of the "medical establishment." Everyone there knew that a signficant change had occurred, and that the tranquil days of the earlier 1960s were gone. I have reviewed the notes that I used in September 1969 and shall now repeat some of the things that I said.

I told the class that the post-Flexnerian era of the NIH that had lasted from 1948 till 1968 had come to an end, and that we were on the threshold of a new social era of medicine. I pointed out the problems of overspecialization, the maldistribution of physicians and physician services, particularly in rural areas and the central cities, and I talked about the rising cost of medical care. I said that the organization of our medical care system was inadequate to cope with the problems of the day. I spoke of the public's support of science, but also of its disappointment with access to medical care. I also noted that the public now considered medical care a right and not a privilege. I told them that medical schools needed to face the problems of providing care on a rational basis, including how to provide adequate primary care, and how to relate this to secondary and tertiary care. I also said that medical schools needed to satisfy the feeling of communities that they too should participate in the organization of medical services. I noted that we were in a period of transition, that the problem facing us was how to preserve the best of the era that was ending while pushing forward toward a new era.

Finally, I said: "Because we are in a period of transition many questions will be raised by you as students and among them will be—what relevance does molecular biology or renal physiology have to the problems of Roxbury, Harlem, Hough, Appalachia, and Watts? I suppose the answer is nothing and everything. Medical science alone is not going to solve the problems of providing medical care, but without it medical care will be so inferior in quality that it will not matter much whether it is available or not."[5]

In 1969, student interests and career choices suddenly shifted, and academic medicine and psychiatry were no longer the most popular

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choices. Primary care became the choice not only of many biosocial students, but a significant number of bioscientific students as well, and it was not unusual for a student who had excelled as a college major in chemistry to choose a family-medicine residency. Biosocial students, who a year earlier would have chosen psychiatry, now considered careers in public health.

Attitudes changed as well.[6] Six percent of the class of 1963 favored group practice, compared to 98 percent of the class of 1971. Of the class of 1963 questioned at the time of graduation, only 5 percent favored abolishing fee-for-service, 13 percent favored national health insurance, and 14 percent were dissatisfied with the medical care system. When the class of 1971 answered the same questions at graduation the answers were strikingly different. Sixty-one percent favored abolishing fee-for-service, 81 percent favored national health insurance, and 86 percent were dissatisfied with the delivery of medical care. By no stretch of the imagination can these changes in attitude be attributed to a change in the medical school environment or a change in the curriculum. These were changes associated with change in the environment outside the university.

I have emphasized the constancy of the internal environment, but in 1969 that environment began to change. The changing attitudes of students had an impact, and some members of medical faculties were sensitive to the events in the outside world and were sympathetic to social change. Finally, at the end of the decade many medical schools made a commitment to increase the representation of minorities in their student bodies. But it should be remembered that it was the force of external events, not internally generated ideas, that caused these changes in the internal environment.

How much of the change was permanent and how much transient? Looking back at my own experience as a dean, I can recall some difficult times in the three or four years following the spring of 1969. Students were sometimes rebellious, and at all times critical of the medical school establishment. They decried the lack of involvement of Harvard's teaching hospitals in their local communities, and protested the sacrifice of any community housing in order to build a new teaching hospital. Their efforts supported a newly organized community group called the Roxbury Tenants of Harvard, which became a formidable force, dedicated both to new housing and to the integrity of old housing. New housing was built, with Harvard's help,

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and the new Brigham and Women's Hospital was finally launched without sacrificing existing housing. Student activism was a transient phenomenon, however, and subsided once the Vietnam War ended, but the Harvard Medical School student body did change. Minority representation of 15 to 20 percent in classes with more than one-third women came to be the norm during the 1970s, and this certainly changed one part of the internal environment.

I sometimes ask myself if I would want to go through the period of student activism again, and the answer is invariably "no." But I do not regret that it happened, even though it created tensions that were almost always unpleasant and at times even counterproductive, for there was a positive aspect to student activism. Possibly for the first time in the history of American medical education, students became truly concerned about the inequities in our society, including the way in which we provided medical care for the poor. Unfortunately, as the student activist movement faded, so did many of the social concerns of students.

My remarks to the entering first-year class in the fall of 1969 were accurate in terms of the problems facing our medical care system, but were far less prescient in predicting the future. It had been my hope that a new social era for American academic medical centers was to begin, and that they, together with their universities, would address the problems of access, cost, overspecialization, and regional planning. Fifteen years later, it is quite clear that they did not. I shall try to tell why, but first let me summarize briefly what happened to both the external and internal environments between the end of the 1960s and the present.

The end of the Vietnam War brought with it the end of student activism, and the relative tranquility of college campuses by the mid-1970s was reflected in the medical school environment. There were still concerns in the body politic about the role of women and minorities in American society—including the professions—and medical schools responded to this with affirmative action programs, but there was no longer outside pressure to become involved in other areas of social reform. Nevertheless, other kinds of intense pressures were brought to bear on medical schools during the 1970s, and the end of student activism did not mean a return to the supportive external environment of the 1960s.

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Congressional leaders, reflecting the feelings of their constituents, began to find fault with medical schools for educating too few physicians and for training too many specialists. The observation was made that there was both a shortage of physicians and a maldistribution, the latter being partly geographic and partly among the medical specialties.[7] For the first time the federal government provided direct support for medical education, using capitation allowances to induce an increase in class size and start up costs for new medical schools. During the decade of the 1970s, the number of medical schools increased from 101 to 126, and total enrollment of medical students rose from 30,084 to 63,800.[8] The plateauing for federal support for research made medical schools particularly responsive to another source of federal funding, but the direct support of medical education via capitation allowances for each student admitted was short-lived; by the end of the decade, the GMENAC report[9] stated unequivocally that not only was there no longer any shortage of physicians—if there had ever been one—but that we would have a significant oversupply in the near future. By the end of the decade, capitation allowances were phased out and medical schools learned a bitter lesson—namely that Congress had never intended long-term direct support of medical education.

Congress also attempted to influence the distribution of physicians among the specialties using the Family Practice of Medicine Act of 1970[10] and the Health Professions Education Assistance Act of 1976.[11] The latter tied capitation to the percentage of residents in primary care residency, but that effort became moot once it was decided to discontinue capitation allowances. Congressional effort to increase the supply of physicians was clearly a success, but legislation during the 1970s had far less influence on the training of specialists, since the funding of residency training was paid for directly by third-party payors including the federal government. Some increase in the number of training programs for family physicians and primary care internists and pediatricians did occur, but not to the degree Congress would have favored. Curiously, there was a distinct disincentive to train primary care physicians in ambulatory care settings, since the support of residency training was tied to hospital care, meaning inpatient care for the most part. Obviously, this favored the medical and surgical specialties rather than those concerned with primary care.

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Even though the great optimism about the future of academic medicine that characterized the 1960s did not carry over into the 1970s, the structure of the internal environment based in the specialists and subspecialists of medicine did not change. In fact, it was reinforced by the expansion of faculty practice plans, the earnings of which, by the end of the decade, equalled or surpassed the federal government's financial contribution to the support of medical education. The dollar support of research and research training, even in constant dollars, continued to increase during the 1970s, but the percent of support that this represented fell from a high of 55 percent in 1965 to less than 30 percent by the end of the decade. The number of full-time clinical faculty grew from 19,256 at the start of the decade to 36,566 by the end of the 1970s, an increase only partly related to the augmented enrollment of medical students.[12] Much of the increase was related to the expansion of faculty practice plans, and these plans now became as important a part of the internal environment as the research enterprise; in many schools they were more important.

During the same period, research was becoming technically more complex and more expensive, so that full-time clinical faculties became further divided between those who received their support largely from research grants and those who generated support for the practice of medicine. The ideal academic clinician of the 1960s, who could participate with equal facility in research, teaching, and patient care, was fast becoming a disappearing breed. By the end of the decade, those specialists heavily engaged in clinical practice were likely to be more visible to students than those academics engaged in research, so that the internal environment of the teaching hospital became more practical than academic.

When one speaks of medical school teaching, the listener is likely to equate this with the teaching of medical students, but that would be only partially correct. It is true that the teaching of medical students is a concern of the clinical faculty, but the nature of clinical teaching is such that the student is far more likely to be directly supervised by a resident or fellow than by a member of the faculty. Clinical teaching is done at the bedside or in the examining room with real patients, and the student learns by doing. There is nothing inherently wrong with this system, but it depends heavily on a hierarchy of students, with the medical student at the bottom of the

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ladder, first and second year resident next in line, and finally the senior resident and fellow at the top. If one were to assign a priority to teaching on the basis of interest, there is little question where the primary interest of most clinical faculty members would be found. They would be most interested in the fellows in their own subspecialty areas, next in the residents in their specialties, and finally in medical students. I make this point for two reasons. First, because the people who are most likely to influence the thinking of medical students are the residents and fellows in the teaching hospitals, and usually these are individuals narrowly focused on mastering a particular specialty. Secondly, because anything that alters the pattern of residency training will change the environment for medical students.

Family practice programs and departments were established in many medical schools during the 1970s, and formalized training programs were established for primary care physicians in departments of medicine and pediatrics. But neither departments of family medicine nor divisions of general medicine or general pediatrics attained full acceptance in academic medical centers. The reasons were two-fold. First, these primary care specialties were not perceived as having any unique technologies or knowledge to contribute at the clinical level, and secondly, they did not appear to have an important research agenda. Obviously, the attitudes of faculty members in the more prestigious subspecialties color the thinking of medical students toward primary care.

Medical students themselves make up an important part of the internal environment, just as do residents, fellows, and faculty, and the student body changed during the 1970s. There were more members of minority groups—though fewer than many had hoped for—and more women. By the beginning of the 1980s, women represented more than one-third of all students enrolled in medical schools and the proportion appeared to be rising. Thus, the student body became more diverse than during the 1960s, and student organizations representing various minorities and women were formed. Student activism subsided with the end of the Vietnam War, although it lasted a little longer in medical schools, since student activists of the late 1960s and early 1970s were still in medical school by the mid-1970s. Broader social concern was replaced by the concerns of minority groups, and by very practical worry about a choice of careers. These practical considerations were accentuated by

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rapidly rising tuition costs and the concomitant rise in student indebtedness.

The external environment seems to have changed during each decade, and the predominant external force being felt by academic medical centers during the 1980s is cost control. The rising cost of medical care was evident during the 1970s, but it was not until the 1980s that government and the private sector decided that drastic measures had to be taken. The two that worry academic medical centers the most are: prospective payment of hospitals; and the trend toward more and more prepayment for medical care on a capitation basis. The first threatens to constrain the costs of teaching, particularly the teaching of residents and fellows, and the second threatens the income of fee-for-service faculty practice plans. Prospective payment by Medicare on the basis of so-called diagnostic related groups or DRGs has led to a shortening of the length of hospital stay for most patients. This makes clinical teaching more difficult, and it has also caused a real reduction in bed occupancy that further threatens the financial viability of teaching hospitals. In the mid-1980s, anxiety has replaced confidence, and a concern for the financial future of academic medical centers has replaced the optimism of the 1960s. To many, the fortunes of academic medicine seem at a low ebb.

Something else has happened, the impact of which may be more profound than the efforts of cost control, yet it is not a phenomenon that has been fully recognized by the academic community. Academic medicine no longer dominates the practice of medicine as it did beginning in the 1950s; it no longer sets the pattern of practice; with a few exceptions it has not been involved in new patterns of patient care, particularly prepaid comprehensive care; it no longer calls the tune for community hospitals, and it is unsure of what it should do about the for-profit health-care corporations. Academic medicine will not realize how much power it had until it loses more of it, and then it may be too late to recoup.

Despite the gloom that pervades the academic medical establishment, medical schools will survive, so that is not a cause for unhappiness. What is sad, however, is to examine the opportunities that were missed. Why did academic medical centers fail to fulfill a social agenda as effectively as they did their biomedical research role? Why did they not use their very considerable power to reform the

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medical care system—or at least aid in its reform? I believe the reasons for these failures can be found in some fundamental institutional flaws, all of which are interrelated and all of which, in one way or another, had their origins in the way in which the second revolution of medical education was initiated. Before identifying these flaws, however, it is important to point out the very real accomplishments of these academic medical centers. They produced some first-rate research, both fundamental and applied, and they trained some fine basic and clinical scientists. They introduced new technologies that greatly expanded what the physician in practice could do for his patients, and they set new standards for specialty care. Whatever one may think about a maldistribution of manpower among the medical specialties, it is reassuring to know that, in general, the specialists who completed training programs were well trained. In large part as a result of NIH funding and the work done in academic medical centers, the United States became the unquestioned world leader in biomedical research. Indeed, much of what was accomplished was helped by the very flaws I will describe.

The most profound flaw affecting academic medicine today is divided loyalty, and this began, based on the best of intentions, with the decision of the NIH to fund individuals and not institutions. The rapid expansion of full-time medical faculties during the 1950s and 1960s was dependent on NIH funding, and it was not uncommon for members of full-time faculties to receive all, or almost all, of their salary support from federal funds. Research grants and training grants were submitted by individuals or groups of individuals, with the university or medical center acting as the financial agent and receiving an overhead allowance for indirect costs. This system caused many faculty members to feel a greater loyalty to the NIH than to the university, and often to resent the amount of overhead claim by the university or medical center. The development of profitable faculty practice plans compounded the division of loyalty, only this time within the institution. Departments or subspecialties with lucrative practice plans, such as cardiac surgery, ophthalmology, or gastroenterology, resented the fact that they not only provided the major support for their own departments or divisions, but subsidized low earners, such as pediatrics, as well. Inevitably, the power structure of the academic medical center evolved into one that was determined to a significant degree by the ability of departments or

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divisions to generate outside funds, either through research grants or practice plans. This is not a system calculated to promote social reform, and once student activism had subsided, including activism on the part of residents and fellows, there was almost no internal pressure to do anything but maintain the status quo. There were islands of interest in reform of the medical care system within academic medical centers, usually in departments of social or community medicine, family practice, general medicine, or general pediatrics, but these departments or divisions wielded little power since they generated little income.

A second flaw was the dominance of the primary or university teaching hospital in dictating the direction the academic medical center should take. Theoretically, the academic medical center was to be a consortium of peer groups, with the deans of the several health schools, including medical, nursing, and dental, as equals and department heads as equals. But, as so often happens, some are more equal than others, and the dean of the medical school was more important than the other deans, and the heads of the major clinical departments had more authority than the heads of other departments. Often a vice-chancellor or vice-president for health affairs was appointed to preside over the academic medical center, but more often than not his authority was tempered by the countervailing power of the clinical chiefs. It was in their self-interest to protect their hospital services, and anything that might threaten those services was viewed as hostile and to be rejected. Anything that expanded or strengthened their inpatient services was favored.

The dream of those who participated in the beginning of the second revolution was to bring the medical school and teaching hospital into complete union with the university. As we have seen, that dream was not only unfulfilled, there was a further drifting apart of the university and academic medical center as the latter expanded. There may have been a more fundamental reason for this separation, however, relating to the dominant role of the teaching hospital in the academic medical center. The name "teaching hospital" suggests that the primary purpose of such a hospital is teaching, and while some would claim that as the ideal, the fact is that teaching hospitals are far more financially dependent on the care they provide than on the teaching they do. This fact separates them from almost everything else the university does. Unfortunately, the fiction that a university

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teaching hospital is an integral part of the university has made it more, rather than less, difficult to develop collaboration between the academic medical center and other divisions of the university. It is often easier to make a cooperative arrangement based on mutual self-interest between two relatively autonomous institutions than to do the same thing based on some theoretical institutional identification, particularly if there is resentment about differences in salary scales and other prerogatives within that institution. Had there been any inclination for an academic medical center to plan for care on a regional basis, it would have been simpler to work out contractual arrangements with those university departments or schools having planning expertise, rather than to expect such collaboration to occur simply because it was being done under the rubric of the university. In summary, three observations are in order. First, it is probably a mistake for a university to try to make any large service organization an integral part of the university. Second, the clear recognition that a teaching hospital is not an integral part of the university is likely to make joint planning easier, rather than more difficult. Third, the worst solution is to pretend that a major teaching hospital is an integral part of the university when it is not.

The fourth institutional flaw is the dependence of the academic medical center on the specialty practice of medicine. Most teaching hospitals consider their role as tertiary care referral centers based on the specialty practice of medicine. There is good reason for this, since these same institutions participated in the development of the technology of tertiary care, and generally are well equipped to provide it. Unfortunately, the reality differs from the ideal. To begin with, these hospitals usually depend on the admission of a significant number of nontertiary care patients in order to maintain occupancy at acceptable levels. There is a more important reason, however, why they fall short of the ideal. They trained the competition. Partly as a matter of prestige and partly to have additional help in caring for patients, each of the specialties of the teaching hospital recruited as many residents and fellows as they could train. Many, if not most, of these trainees went into practice in community hospitals, where they were able to provide the same kind of tertiary care they learned to give at the teaching hospital. Why it never occurred to those who were doing the training that they were preparing the competition is beyond me. It was naive to think that a newly trained cardiac surgeon would refer

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his cases back to the teaching hospital, if he had become entirely competent to perform the surgery himself.

The final flaw that I shall list is the dependence of academic medical centers on a fee-for-service system, and one that profits from the use of the most expensive medical technologies. Once faculty practice plans became the largest source of income for faculty salaries it was inevitable that those involved would protect a payment system designed to provide the maximum dollar return, and would reject, as long as possible, prepayment on a capitation basis.

What has been the consequence of these flaws? First of all, the ability of academic medical centers to plan on an institutional basis has been stunted. Many now feel that they must plan or go under, yet most are unprepared to do so. The second consequence has been the failure of the majority of academic medical centers to develop innovative approaches to patient care. In fairness, there have been exceptions, but usually these have not been initiated by the most powerful clinical departments, and, therefore, have rarely resulted in institutional change. A third consequence has been the failure to recognize what was going on in the world outside the medical center and to reflect on how that might effect the functions of the center. Lobbying was considered more important than policy analysis, with the result that the medical academic community completely misread both the reasons for, and the consequences of, cost control. It believed firmly in the fiction it had helped to create—namely that the costs of teaching, research, and patient care are inseparable.

Finally, in an attempt to preserve the status quo, these centers have failed to conceptualize what the ideal setting for the training of a physician should be in the year 2000. One can reasonably argue that it is not the function of academic medical centers to reform our medical care system, but it is not reasonable to argue that the teaching environment should remain unchanged even though the practice environment is radically changed. And I believe it will be radically changed. I believe that we shall continue to evolve in the direction of medical care systems that assure the patient a complete range of services, more often than not, on a prepaid basis. If this is true, academic medical centers must participate in the development of such systems if they are to provide their students with appropriate learning experiences.

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To many of my academic colleagues my remarks will seem hypercritical, and to them I say this: If I thought you were of mediocre ability, or incapable of change, I would say nothing. It is because I believe you to be men and women of goodwill, who have the capacity to reexamine where you have been, and to speculate about where you are going, that I have been so harsh in my comments. I want you to be angry, for it may force you to think about some changes that would have been unthinkable a decade ago. Instead of poking at the embers of a dying dream, I want you to rekindle the fire of enthusiasm that you had in the sixties, only this time with the goal of making available to all of our citizens, at a price they can afford, the great advances in medicine that you helped to forge. Reclaim the leadership that is rapidly slipping from your hands, and behave in keeping with what you are—the brightest members of the medical profession.

ENDNOTES

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[5]Robert H. Ebert, Notes for presentation to the entering class of 1973 at Harvard Medical School, September 1969.

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Paul B. Beeson

The Changing Role Model, and the Shift in Power

THE ROLE OF THE CHAIRMAN of a department of medicine changed during the period of Walsh McDermott's professional activity, from the thirties to the eighties; the chairman left the daily bedside rounds where, as a medical practitioner, he provided an example students sought to imitate, and assumed administrative duties, far from patient care and clinical decisions.

The following descriptions of the style and methods of two department chairmen in the thirties and forties reveal men who were looked upon as role models, as exemplars of excellence in medical practice. A modern department chairman, however, finds it difficult, or impossible, to project this image of clinician-and-teacher, in the classic Oslerian style.

Arthur L. Bloomfield (1888–1962). After graduating from the Johns Hopkins Medical School in 1911, Bloomfield served as intern and assistant resident there; he spent the next four years as chief medical resident before leaving for a period of study abroad. He returned to a faculty post at Hopkins, where he was advanced to the rank of associate professor. In 1926, at the age of thirty-eight, he accepted an offer to become professor and chairman of the Department of Medicine at the Stanford Medical School—then located in San Francisco. David Rytand, who received his M.D. degree at Stanford in 1932, wrote of him:

In the 1932 period there were no problems because Bloomfield was The Professor; he had superiority in age, experience, training, knowledge,

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intelligence, clinical acumen in a period of time during which, as you know all too well, we had not much available treatment to offer. If The Professor said that Mr. Smith had a presystolic murmur, so be it; there was no appeal. If Mr. Jones should receive Sippy powders; also so be it; what else was there to do?[1]

In a booklet entitled *Medicine and the Stanford University School of Medicine Circa 1932: The Way It Was,* Rytand describes Bloomfield's ward-room teaching:

. . . A patient assigned as late as 6 p.m. or so might well be presented at next morning's rounds. Escorted by the chief resident, the professor entered the ward promptly at 9 a.m. and went directly to the bedside, where he stood by the right side of the patient's head. Across from him stood the nurse, who facilitated his physical examination by deftly manipulating the pre-arranged bedclothes and who used a small towel to cover the genitalia and female breasts; during chest examination she also deflected the patient's breath with a paper napkin. The nurse on rounds also carried a small, white enamel tray which contained flashlight, tongue blades, oto-ophthalmoscope, sphygmomanometer, reflex hammer, tuning fork, pins, sticks with cotton-wisp tips, grip dynamometer, tape measure, and marking pencil; there even was a lemon coated with paraffin (as lemons had been shipped in earlier times) to illustrate what our predecessors had meant by the lemon-yellow skin tint of patients with pernicious anemia. Unlike the lemon, the instruments were there for use rather than for show; we six students watched the way in which a medical professor actually performed an examination. One of us, presenting the patient, stood across the bed from Bloomfield and next to the nurse with the intern at his left; residents and others of the group had accustomed places ranging around the foot of the bed."[2]

In the same booklet is a description of Bloomfield's weekly medical conference:

For Tuesday's set clinic in medicine, Bloomfield selected a suitable patient on Thursday or Friday, when the student who "had the case" was notified that he would give the presentation. A patient, with a nurse from the ward, arrived on a guerney or in a wheelchair just before the appointed hour. A perspiring and palpitating junior student gave the presentation.[3] Details of the history were filled in, where necessary, by adroit questions from Bloomfield (or occasionally, from the audience); the patient, always coached in advance about the exercise usually enjoyed his or her experience (or at least seemed to do so), and was excused to return to the ward prior to further discussion. The large blackboard had been filled by the student that

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morning with an outline or other relevant material given him by Bloomfield on Monday. Then the questions began, from Bloomfield to the student at first, to the audience later. In freshly donned newly cleaned white coat, hands clasped behind him, teetering gently on heels, he went to work and within the hour made complex topics simple. Case history, the findings, abnormal physiology, differential and specific diagnosis and management of that particular patient were covered in order, with a bit of historical perspective, and a few advanced tidbits for the older folks in attendance. How that man could teach![4]

Lowell Rantz, another student of Bloomfield's said in a biographical memoir:

Dr. Bloomfield was known and revered throughout his later years as a master clinician, scholar and teacher. His bedside and Grand Rounds were unforgettable experiences for all who participated in them. Before his retirement in 1954, twenty-eight classes of students, interns and residents had passed before him. His influence over all these individuals was very great and many were diverted into academic pursuits entirely by contact with him.[5]

William S. McCann (1889–1971). Having graduated from Cornell Medical College, McCann served an internship and a period of neurological research with Harvey Cushing. At the end of World War I, he became a research fellow at the Russell Sage Institute, Bellevue Hospital, and later a member of the medical faculty at Hopkins where he had special responsibility for metabolic studies. In 1924, at age thirty-five, he became the first chairman of the Department of Medicine in the new University of Rochester School of Medicine, a post which he held for thirty-three years. Lawrence Young, who graduated in medicine at Rochester in 1939 and later succeeded McCann as chairman, has written as follows:

During most months of each year, Dr. McCann made floor rounds two mornings weekly with house staff and medical students. He was accompanied frequently by the chief resident. These rounds were chiefly for teaching and not intended to relieve attending physicians of their primary responsibilities. Some patients were seen briefly, others in depth, so that Dr. McCann served as a highly influential role model, especially as he interviewed and examined patients and discussed important details of comprehensive care. During most of his visits, he learned much about how the house staff, students and nursing staff were handling their duties. Occasional differences

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of opinion with attending physicians usually were discussed later with the attendings by the chief resident.

Each week another member of the senior full-time staff conducted complementary (professor's) rounds on the two medical floors not being visited by Dr. McCann. In this way, all four of the major floors were visited weekly.

Dr. McCann delegated responsibilities for clinical decision-making to the attending staff and house staff and very importantly to the chief resident, who also served as a role model. All persons involved with patient care seemed to understand that Dr. McCann trusted them and they tried hard to fulfill that trust. The surveillance that he exercised with dignity, compassion, and a sense of humor, was accepted as being just right.

Young also says this of the early days of McCann's chairmanship:

Dr. McCann held strong and frequently expressed views on having all members of the full-time staff serve primarily as general internists, albeit with increasing interests and expertise in a specialty as their careers developed. During his tenure, there were no divisions or sections with defined budgets, space and administrative structure. Most of the subspecialties were represented by one or two senior full-time staff members and one or two research fellows. There was no segregation of inpatients by category of disease; all were admitted to general medical floors. After World War II, research grants and research fellowships became increasingly available from federal agencies, with consequent increase in numbers of research fellows and technicians. The categorical groups were then often referred to as "chest lab," "hematology lab," or "metabolism lab," but never as divisions. Soon after the chairmanship changed in 1957, the subspecialty groups were designated as "units," each with a "unit head."[6]

In 1939, fifteen years after McCann had taken up his post at Rochester, there were eight full-time staff members in the department of medicine holding the position of assistant professor or above. When Young became chairman in 1957, the number had risen to fourteen, all of whom were based at the University Medical Center. By the end of Young's chairmanship in 1974, the number of full-time senior staff in the Department of Medicine had risen to one hundred; sixty at the University Medical Center and forty in four affiliated hospitals. Before 1957, McCann was the only member of the department with the rank of professor; by 1973, there were twenty-three professors.

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In a memorial note on McCann, Young said this:

> Dr. McCann invariably made patients feel better because of his sincere interest in their personal problems, as well as in their diseases. Grateful patients and friends gave large portions of their treasure to the medical school of the University of Rochester because they trusted him. They saw in him the personification of ideals that deserved to be perpetuated in our society and in the institution that he helped to establish.[7]

Throughout their tenure as heads of departments of medicine, Bloomfield and McCann, though based full-time in their teaching hospitals, earned parts of their incomes in professional fees, generated by the care of private patients. They were then constantly engaged in "hands-on" clinical medicine. Each of them habitually made "professor's rounds" on two wards each week, and there they could be observed dealing with problems covering the whole range of clinical medicine.

To illustrate how things have changed, let me present a fictional case of a more recent chairman, as it might appear in a memorial note written by a long-time associate, for the *Transactions of the Association of American Physicians.*

John A. Smith (1922–1992). Smith received the M.D. degree in 1947 at Abraham Flexner University, and served for three years as intern and resident on the medical service at the University Hospital. He then moved to the National Institutes of Welfare, to spend three years engaged in genetics research, in Gregor Mendel's unit. His first clinical faculty appointment was in the Department of Medicine at the William H. Welch School of Medicine, where he advanced in faculty rank to the level of associate professor of medicine. At Welch he carried on an active program of laboratory investigation, studying the biochemical characteristics of tissues derived from patients with hereditary disorders. His work was supported by generous research grants, which enabled him to recruit and train a number of able research fellows. He was elected to the American Society for Clinical Investigation and to the Association of American Physicians. He frequently attended and participated in meetings of geneticists, in the United States and abroad, and served on the editorial boards of journals dealing with his field of interest. In addition, he managed to

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take his turn as teacher of general clinical medicine, in the wards and in the outpatient clinics.

In 1960, Smith accepted the invitation to become chairman of the Department of Internal Medicine at Emerson University, a post he held until 1968. During his tenure as chairman, the department went through a phase of spectacular growth. Ten subspecialty divisions were established, and the number of salaried faculty in the department rose from twenty-four to ninety-six. Affiliations were negotiated with three hospitals in the area, and a combined residency training program set up for the group of four teaching hospitals. Emerson medical students were assigned to any of those for clerkship experience. The departmental budget rose from less than $1 million to more than $10 million, almost all of that in the form of research grants. In addition, he was able to persuade private foundations to make contributions, the most important being funds to construct a six-storey research building adjacent to the University Hospital, to house the various new laboratories of his department members. He was not only an excellent "talent scout" for the new faculty, but a respected team leader, and showed skill in managing the increased sums of money from grants and from fees for private patient care, earned by all members of the department. He tried always to attend the weekly Grand Rounds held in the new auditorium seating 250 people, but delegated the selection of cases and of discussors to the chief resident. His special clinical interest was in Huntington's chorea, and he followed patients with that disorder, by appointment, in the outpatient clinic. To his regret he recognized that there would no longer be time to have regular bedside teaching contact with medical students, but he did continue to take resident's morning report at the University Hospital several months each year. Especially distressing for him was lack of time to participate personally in the research program of his laboratory. He continued to obtain grant support, on a smaller scale than he had at Welch, but it became necessary to depend heavily on his long-time colleague, Thomas Hodgkin, and on research fellows, to conduct the day-to-day work in the research laboratory.

He became involved in many national affairs, serving as a member of study sections as well as other advisory committees; he made some site visits, and was a valued reviewer of scientific publications. He

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also wrote the section on hereditary disorders for the Sydenham textbook of medicine for several editions.

In 1968, an institutional review committee considered Dr. Smith's performance as chairman, and approved his reappointment, but he decided to relinquish the responsibility, with the aim of resuming his laboratory research in the fast-moving field of genetics. But the return to bench research was not easy; many new concepts and laboratory techniques had been introduced in the preceding few years. Indeed, toward the end of his academic career he experienced some difficulty in obtaining research support.

On his retirement in 1987, a new building in the medical center was named for him. His last years were spent at his vacation home, on the coast of Maine where he engaged in some writing, chiefly on historical topics.

Toward the end of his academic career, Smith confided to some of us that he regretted the decision to head a department, despite the dramatic expansion that had been accomplished during his eight-year tenure. He thought that in the long run he would have gained greater personal satisfaction if he had decided to continue as head of a division within a department of medicine.

Changes in the size and organization of departments of medicine help to explain why Dr. Smith's career was so different from that of Bloomfield or McCann; the demands on a chairman have altered, as have his priorities. Yet a few specific questions should be addressed to explain the choices Dr. Smith made during his career.

Why was he willing to forego direct involvement in patient care and bedside teaching, as well as his participation in research work in the laboratory? He, like many others, could not have realized how compelling and incessant are other demands on the chairperson of a modern department of medicine. He undoubtedly thought, as many others have, that he could do all the traditional things, and still handle the executive functions of his office.

Were activities such as recruiting staff, attending conferences worldwide, and negotiating with hospital administrators more attractive than the quieter life of patient care, teaching, and research? These are exciting, especially at first, and a heady feeling comes from playing a key role in the affairs of one's institution.

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Why did he find it difficult to regain his place in the forefront of clinical genetics research after the eight-year hiatus as department chairman—was it because he had grown older, less imaginative, less innovative? There can be no denying that young investigators seem to make more than their share of the exciting advances in biomedical research. Is it their youth, or is it because they are not burdened with other time-consuming duties? I have given some thought to this, have talked with others about it, and the answer is by no means clear. Certainly one can point to scientists who have continued to produce important work, after reaching the age of fifty or sixty. But, perhaps unfortunately, we have a tendency to "reward" good young investigators by rapid academic promotion, making them responsible for the careers of still younger individuals, and we thus encroach on their opportunity for leisurely conduct of their own investigations. In the case of Dr. Smith, I am suggesting that he fell behind because he did not have time to keep abreast of the rapidly changing technology of genetic engineering and DNA manipulation.

The simple reason why the role-model professor has vanished, and why there has been a shift in power, is that huge sums of money became available for biomedical research and training after World War II. This swiftly brought about changes in the size and organization of clinical departments, particularly departments of medicine. From about 1950 to the latter part of the sixties the largesse available to academic medicine seemed almost unlimited. I was chairman of the Department of Medicine at Yale during those years, and recall asking "What *else* should I be asking for?" While I was at Yale, from 1952 until 1965, the number of salaried faculty increased from twelve to sixty-five. That growth did not cease in 1965; I understand that the present number is about 105. My impression is that growth in faculty has slowed or stopped in this decade, because research funding has tended to level off.

There has been some increase in size in the medical school classes, because of predictions made by several advisory committees from the 1950s on, that the country would be short of doctors by the 1990s. In most schools this increase in student numbers made it necessary to arrange for some of the clinical teaching to take place in affiliated hospitals, which offered somewhat different experiences and teaching methods for individual students, and, of course, lessened their

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opportunity to have contact with the remote figure whose name appeared in the university catalog as head of the department.

The number of house staff also increased, for several reasons. Young graduates planned to qualify for the American Board of Internal Medicine and consequently nearly all wished to serve as house officers for three years. More importantly, the work of a house officer became much more demanding. One can see this by glancing at clinical records of teaching hospitals in the 1930s and 1940s; these reflect a leisurely pace, a paucity of special tests and complicated treatments, and lack of modern intensive-care procedures. Today's house officer has much more to do to bring into use all of the facilities of a modern tertiary-care hospital, and to perform the procedures that he or she can; this means a longer working day. During the same era a social change has taken place; medical students tend to marry before graduation from medical school; consequently, they now insist on more fixed hours of duty, with planned time at home. The only solution is to employ a larger house staff.

I hold the view that the business of house-staff recruitment is of central importance in the effectiveness of a clinical department. With an able group of interns and residents the patients are properly cared for, and the students see in *these* young people role models, who demonstrate the progress that can be made within a few months or years of graduation. In addition, the house staff constitutes the best pool from which future faculty members can be drawn.

The process of selecting interns has also become more complicated since 1950. In the thirties and forties it was often accomplished through a sort of "old boy network"; an internship appointment could be arranged simply by an exchange of letters between chairmen, or a telephone call. But the National Intern Matching Plan, despite its fairness and uniformity, has changed all that. Because of uncertainty about a "match" with the hospital of first choice, a student feels obliged to apply to and to visit several institutions, sometimes ten or twelve. Consequently the number of candidates to be considered and interviewed has greatly increased. This has become so time-consuming that it usually has to be turned over to a faculty committee, with the chairman meeting few, if any, of the candidates.

The greatly augmented flow of new medical knowledge and technology has forced academic clinicians to specialize. Broad competence over the field of general internal medicine, as was expected of

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their staff members by Bloomfield and McCann, is no longer attainable. Departments have been subdivided into specialty units or divisions, with individual faculty hierarchies. James Warren has likened the modern department of medicine to a department store, offering the wide variety of skills and appliances needed for modern diagnosis, treatment, and research.[8] Each division head applies for research and training grants, to support research costs and to pay salaries of fellows and technicians. The result is that the allegiance of a division head becomes divided between the home department and outside granting agencies. The division head is less eager to accept teaching assignments because of the pressure to give adequate time to supervising progress of the research team and, frankly, because of insecurity about clinical teaching outside of his or her special field. The division head takes over the recruitment of junior faculty and fellows, merely clearing their appointments with the chairman as a formality. That, of course, is one aspect of the "shift in power."

So what has come to occupy the time and thought of today's department chairman? His job has taken on an administrative character comparable to that of a medical school dean in the thirties, in terms of number of people he serves and the size of the budget he allocates. Instead of the academic term "chairman" it would perhaps be more appropriate to use the term commonly employed in industry—chief executive officer. The chairperson's office suite has become a management facility, with a lay administrative officer and a staff of several secretaries to deal with appointments, correspondence, memoranda, and reports. It is common to share out some of the administrative functions by designating one or more vice-chairpersons of the department.

One of the most vexing problems faced by the head of a modern clinical department is finding funds to meet the ever-increasing salaries of the clinical faculty. To compete with other institutions and with lucrative opportunities in private practice, clinical faculty salaries have risen rapidly in the last twenty years. When I left Yale in 1965, my salary, the highest in the department of medicine, was $28,000. Today this would be low for a person taking a first appointment as assistant professor, and far less than might be earned in private practice. The obvious source of money to meet these rising salary scales lies in collecting fees for the clinical service provided in teaching hospitals. Mechanisms for collecting fees from third-party

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payors had to be developed. Another difficulty, now that charity hospitals for teaching have disappeared, is that the hospitals controlled by medical schools find themselves competing with community hospitals for patients. The community hospitals, and their private-practicing professional staff members, offer special attractions to patients who have medical insurance, and in fact are often preferred because the attending physicians can give their whole attention to patient care, without time-consuming obligations to teach and conduct research. I know from conversations with several current chairmen of departments of medicine that much of their attention has to be devoted to maintaining faculty salaries at a level that will retain the large numbers of faculty members we recruited so happily in the fifties and sixties. The obvious question, which I shall not attempt to deal with, is whether the time has come to prune away some faculty positions.

The head of a department of medicine must spend a substantial part of each day in the office, seeing people by appointment, conducting private conversations with people entitled to private conversations: members of the department, research fellows, house staff, and students. Such callers wish to talk about future career plans, job offers, need for more laboratory space, or perhaps "turf battles" over certain diseases or certain clinics; should hypertension, for example, be in the province of cardiology or clinical pharmacology?

Now that academic medicine has become "big business," with travel funds available through research grants, many national groups have been formed to exchange information about new developments in special fields of research and health care. Heads of departments are away at meetings more than ever before, and, even when home, spend an appreciable amount of time telephoning or corresponding with people in other institutions about these national affairs.

It is not surprising, then, that the modern department chairman does not find it possible to perform as Bloomfield and McCann did, especially with respect to direct involvement in patient care and clinical decision-making. He or she may attempt to keep in touch with clinical activities at the main teaching hospital, through such devices as morning report with the residents and by attendance at Grand Rounds. But seldom, if ever, does a chairperson go out alone to see a patient. The chairperson is insulated from direct contact with patients by layers of subspecialist authorities in the department, by

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their clinical fellows, and by the hierarchical house-staff establishment. Thus the former role model and last court of appeal on matters of clinical judgment has become a remote figure, who can be seen only by appointment and in connection with other kinds of business.

The head of the modern department is no longer the exemplary teacher at the weekly departmental clinical conference, an exercise now usually held in a large auditorium, at which patients are seldom exhibited. The modern "Grand Round" is too often a forum for visiting clinicians, rather than members of the home department. The discussions tend to be expositions of new techniques of diagnosis and therapy or of research results obtained elsewhere.

The matter of academic governance has become more complex. No longer does the chairperson feel free to adjust a salary or decide about a promotion in academic rank without consultations. These must be negotiated with the dean and the executive faculty committee. In the late sixties, when there was a spirit of revolt, and of disenchantment with the establishment, faculty members began to insist on having more say regarding new appointments, promotions, salary scales, etc. As a result, the chairman of a department is often obliged to appoint a search committee in order to designate a new division head. Governance necessitates more staff meetings, at which the chairman must discuss and explain departmental finances, or talk about plans for the coming year.

Unlike the situation in the era of Bloomfield and McCann, the tenure of appointment as department head is not secure until retirement. Many universities provide for a review to consider reappointment of a chairperson every five to seven years. This has frequently brought about the termination of an appointment. The situation has not changed since I wrote on the subject several years ago:

> At present, only a handful of heads of departments of medicine have held the position as long as ten or twelve years. The disenchantment seems to be bilateral: one hears criticism of the way some are doing their jobs, and at the same time one notes that many have voluntarily given up the position, either to return to work with less administrative responsibility, or to move into a post like a deanship or vice-presidency of a university.

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I quoted some data collected by Eugene Braunwald, to the effect that the average tenure was only 5.6 years and that approximately 17 percent of chairmanships were changing at any given time.[9]

The job description given in this article is not meant to be an expression of disapproval; it is simply offered as a factual answer to the question: "Where have all the leaders gone?" Our present department heads are no less able than their predecessors, and doubtless many of them would like to live quieter lives, practicing and teaching clinical medicine in the way that was possible for Bloomfield and McCann. But those days can never come back. The base of medical knowledge has expanded enormously; diagnostic and therapeutic techniques have become far more complex, and subspecialty practice is essential. At the same time the numbers of medical students, house officers, and research fellows have increased to the point where no faculty member can expect to have personal contact with all of them.

The changing role played by the chairperson has brought with it a shift in power. While today's chairperson is no longer looked upon as the last court of appeal for specific decisions about diagnosis and therapy, he still has power—indeed more than he may care to wield—but it is a different kind of power.

As head of the largest department in the medical school, and the one which carries the largest share of teaching in the undergraduate teaching program, today's chairman of medicine can exert strong leverage throughout the medical center and its affiliated teaching hospitals. Within the department he or she has the key prerogative of allocating available office and laboratory space, as well as making decisions about academic promotion of department members—something that directly affects their incomes. His opinion must receive consideration in discussions of contemplated changes in schoolwide matters such as curriculum change. The holder of this position serves on the school's executive faculty committee, and on comparable committees dealing with hospital affairs, and is therefore in a position to influence decisions about faculty appointments as well as matters connected with inpatient or outpatient care in the teaching hospitals.

Are there any satisfactions for a modern department chairman? In spite of the difficulties I have listed, the satisfactions can be considerable. The amount of time for research, clinical practice, and

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teaching may be less than one would like, but, on the other hand, there is the challenge of molding a strong organization and fostering pride and team-play in that organization. The chairperson is still in the best position to help young people get the opportunities they desire, in terms of fellowship appointments, research facilities, academic advancement, and national recognition. There is satisfaction to be gained vicariously, from witnessing the good performance of a junior staff member who is a product of the department; from an admirable discussion at a clinical conference, an interesting piece of new knowledge obtained in research; from invitations to serve on editorial boards, or to review manuscripts; or from evidence of national recognition signified by election to a prestigious medical research society or the National Academy of Sciences. Barry Wood once compared the job of modern department chairman with that of orchestra leader. When the orchestra makes beautiful music the conductor experiences pleasure, even though he is not a featured soloist.[10]

The most enduring reward and satisfaction must be in being in a position to help able young people who have chosen academic medicine as a career.

ENDNOTES

I am indebted to the following, who sent me interesting and helpful accounts of departments of medicine half a century ago, especially for their descriptions of the heads of those departments, as role models: Thomas P. Almy, George E. Burch, Charles S. Davidson, Ludwig Eichna, Richard L. Landau, David A. Rytand, August G. Swanson, James V. Warren, Maxwell M. Wintrobe, Francis C. Wood, and Lawrence Young.

[1]David A. Rytand, personal communication to the author.

[2]Rytand, *Medicine and the Stanford University School of Medicine Circa 1932: The Way It Was* (Stanford, CA: Department of Medicine and Alumni Association, Stanford University School of Medicine, 1984), pp. 10–11.

[3]A nonmedical reader has asked: "Why would the medical student be perspiring and palpitating? Was there a year-end prize?" Anyone who has been a junior medical student, all too aware of the daunting complexity of clinical lore, would understand that student's anxiety—down there on the floor of the amphitheater with The Professor, watched by classmates, and open to questions pertaining not only to details of his patient's illness, but anything else The Professor might choose to ask!

[4]Rytand, *Medicine and the Stanford University School of Medicine Circa 1932*, op. cit., pp. 15–16.

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[5]Lowell Rantz, "Arthur Leonard Bloomfield," *Transactions of the Association of American Physicians LXXVI* (1963), pp. 12–13.
[6]Lawrence E. Young, personal communication to the author.
[7]Young, "William Sharp McCann," *Transactions of the Association of American Physicians LXXXV* (1973), pp. 35–37.
[8]James V. Warren, Diane N. Plumb, and Gregory L. Trzebiatowski, "A Crisis in Medical Education. Thoughts on Listening to a Conference on Medical Education for the Twenty-First Century," *Journal of the American Medical Association* 253 (1985), pp. 2404–2407.
[9]Paul B. Beeson, "The Ways of Academic Clinical Medicine in America Since World War II," *Man and Medicine* 1 (1979), pp. 65–70.
[10]W. Barry Wood, Jr., "The Logarithmic Phase of Medical Progress," *Journal of Clinical Investigation* 31 (1952), pp. 611–613.

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Robert G. Petersdorf

Medical Schools and Research: Is the Tail Wagging the Dog?

I LIKE THE TITLE "Medical Schools and Research: Is the Tail Wagging the Dog?" better than "All Fours in the Federal Trough," which was originally assigned to me. First, I prefer dogs to pigs. Second, anything written to honor Walsh McDermott ought to evoke the best in us. Even my more genteel title may be somewhat more provocative than it needs to be. I certainly do not question the importance or the value of medical research. Indeed, one has only to think of the striking advances in medicine during the past thirty years to justify the efforts that have been made.

When I graduated from medical school in 1952, our knowledge of immunology and genetics was so limited as to prevent us from understanding the pathophysiology of the connective tissue diseases or the hemoglobinopathies. We lacked the drugs to treat most infections; we had only the most primitive cancer chemotherapeutic agents; except for mercurials and digitalis there were no significant cardiac drugs; we lacked antidepressants. We had little notion of the role of prevention in certain types of cancer; the vaccines that have completely eradicated polio, measles and, for all practical purposes, meningococcal infections were unknown.

The importance of research cannot be questioned. My purpose is to reflect how medical research has altered schools of medicine and their faculties—initially, in my view, to improve them, and recently, perhaps, with less happy results. I am also interested in whether there really is a dearth of medical investigators in medical schools today, as some believe, and how the modern research-intensive university has

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served to alter the life of the individual academic. Finally, I propose to ask whether every medical school need indeed have research as its major mission.

HISTORICAL PERSPECTIVE ON RESEARCH IN SCHOOLS OF MEDICINE[1]

Modern medical schools are relatively recent; most date their beginnings to the Flexner Report, issued in 1909. The first two professors of medicine at Johns Hopkins—William Osler and Llewellys Barker—were part-time professors; each had a large consultative practice. Professors of medicine in most other institutions were practicing consultant physicians who might teach a course in medicine but were not inclined to do research. The allegiance of these professors, who were also usually chiefs of service at a hospital, was primarily to their hospital and never to their university. Influenced largely by the German system, which appointed professors in university departments, and by the development of professorships in certain of the basic-science departments pioneered by Johns Hopkins, and recommended by the Flexner Report, a number of universities—Columbia, Yale, Harvard, and Washington University—followed Hopkins and proceeded to appoint full-time professors in clinical departments, notably departments of medicine. These first professors of medicine generally gathered around them a group of young men (there were very few women in medicine in those days), whose training was extensive and who had studied in several medical centers. Their training was usually in pathology, although certain other basic sciences, including bacteriology, chemistry, and physiology, were also represented. These early full-time faculty members were expected to teach students, interns, and residents and to work in the laboratory, where their research was oriented to the interest and expertise of the professor; a number of independent investigators emerged, and most of the assistants eventually moved on to become chairmen of their own departments.

During the 1920s and 1930s, the investigative efforts in most American medical schools were small and grew slowly. Funds for research were modest, provided largely by private philanthropy. Teaching was the responsibility of a handful of full-time faculty and for the most part practicing physicians; except for small numbers of

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private patients of full-time faculty, most patients in teaching hospitals were ward patients under the care of the house staff.

Research in medical schools received a tremendous boost during World War II when numbers of medical school faculty began to receive government grants and contracts. This early experience with government funding gave investigators some sense of how much more productive they could be. A substantial part of the research enterprise built during the war persisted in one form or another after the war. In the late 1940s and early 1950s, the National Institutes of Health took shape; its training programs gave valuable instruction to many of today's departmental chairmen and division heads, and its categorical support of research remains the focus for many research programs today. Assisted by such research funds, a number of new medical schools were founded. In the West, U.C.L.A., Washington, New Mexico, Arizona, and Utah, to mention only a few, came into prominence. Many were modeled after the best schools in the East; they attracted faculty from Harvard, Hopkins, Rochester, and other established medical centers.

RESEARCH AND DEPARTMENTS OF MEDICINE

In the halcyon 1950s and 1960s, the research enterprise of medical schools grew rapidly; it was a major factor in the growth of research-oriented departments. Research in this period was carried out in basic-science departments and also among their clinical counterparts in departments of medicine. During the fifteen years that I spent as chairman of the Department of Medicine at the University of Washington, the overall activities of the Department tripled; its research activities quintupled. Although inflation has eroded the value of the research dollar, there was an absolute increase in research funds in most departments of medicine. In 1964, the Department of Medicine at the University of Washington had twelve research faculty; in 1979 they numbered sixty-seven. In that setting, "research faculty" came to mean individuals with advanced—either Masters or Ph.D.—degrees who spent all their time doing research, being paid solely from research grants and contracts. In addition, a large number of regular faculty came to earn part of their salaries from research grants or contracts, training grants or research career development awards. At the University of California in San Diego,

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the overall medical school budget is about eighty million dollars a year, thirty million of which comes directly from research grants or contracts.

IMPLICATIONS OF INCREASED RESEARCH FUNDING

The temptations placed before talented and entrepreneurial clinical investigators by such grants, contracts, and awards are obvious. Since the successful applicant commits himself to additional research, he will need help to fulfill his other obligations. The conventional wisdom is that an aggressive faculty who compete successfully for peer-reviewed grants are more likely to assure academic excellence than those who neglect to do so. It is taken for granted that they will be helped.

Whether the relentless pursuit of the research dollar has perverted the mission of the academic enterprise is not much discussed. In the never-ending quest for funding, the clinical investigator is obliged to write more and more grant applications to various agencies, leaving him all too little time to be creative at the bench. Talented young investigators can become premature research administrators who spend much of their time keeping the operation funded. The fight to maintain the funding is simply aggravated by the need for the busy research administrator to hire additional faculty to do the research, believing that this will help him compete for renewal. As the research group grows, the financial stresses, both on the department and the institution that houses it, become progressively greater. Shrinking institutional resources may be required to carry investigators whose grant support has run out and who need institutional help to keep going while they prepare yet another grant application. This phenomenon is becoming increasingly common as research funds are curtailed. As with many of our most active clinicians, investigators have been placed on a competitive treadmill from which there is no escape.

The stress on the institution is reflected not only in the progressive growth of faculty, but also in the insatiable need for space. To be victimized by the entrepreneurial investigator who asks permission to apply for yet another grant, giving assurances that no new space would be required, is all too common. Three to six months after the grant is awarded, the investigator reappears seeking more space so that the terms of the grant or contract can be fulfilled. Since most

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medical schools are not able to increase the size of their physical plants radically, least of all their laboratory space, expanding research programs creates very substantial problems.

In response, the argument has been made that the only path to a medical school's greatness lies in nurturing and expanding its research enterprise. The best and the brightest will be encouraged to stay in academic life, or in a particular place in academic life, only if they are permitted to grow and expand. Such an argument would be valid if medical schools had been born with an excretory system; alas, this is not the case. Tenure and other instruments that offer the university faculty members extraordinary opportunities for lifetime employment, even after their productivity ceases, make it difficult for universities to keep up with the "space race." Only when a balance has been struck between the productive who require additional space and the unproductive who require less will the university be able to cope with its progressively contracting laboratory resources.

The dependence of many of our medical schools on grant funds is particularly evident in research-oriented departments of medicine which, as a group, are "soft money" operations; the greater the department's research orientation, the softer is its funding. To cite a common example, in 1979, the total budget of the Department of Medicine at the University of Washington was nearly thirty-three million dollars. Of that amount, 80 percent was furnished by the federal government. In fact, this figure was even higher because funds that came to the department from Medicare and Medicaid were not calculated as federal funding. Of this 80 percent, 60 percent came from the NIH, 17 percent from the Veterans Administration, and 3 percent from the Public Health Service. Of these federally allocated funds, 40 percent were spent on salaries of faculty, research fellows, and residents, and 60 percent for supporting staff. No less than 60 percent of faculty salaries were assumed by the government through grants to individual investigators, funds provided by Veterans Administration and Public Health Service hospitals, or grants made to the university or to its affiliated Cancer Center. Only 40 percent of salary support came from nonfederal sources; it was about equally divided between institutional support, practice income, and funding from private hospitals. The tail was indeed wagging the dog!

Although the sources of funding will vary from department to department, the heavy dependence on federal support of all research-

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oriented departments of medicine is evident. This dependence on federal funds has a number of additional implications:

(1) For the last several years, federal budgets have generally been kept at a plateau; they have not kept pace either with inflation or with the increased number of grant applications.

(2) As a consequence, a smaller fraction of competitive grant renewals are funded; greater numbers of faculty are required to find other sources of support.

(3) During the last five years, in most instances, state support has also leveled off; fiscal growth in most departments of medicine has come primarily from increased funding by the Veterans Administration hospitals, private hospitals, and from practice income. All of these tend to be related to increased clinical activities.

(4) Although practice income made up a relatively small segment of the budget in the Department of Medicine at the University of Washington, it accounts for a much larger part of the budget in many other departments of medicine. The greater the dependence on practice income, the less likely it is that such departments will be very productive as research centers.

(5) An examination of the functions of a typical research-oriented department of medicine, which also takes into account its sources of income, will generally show that funds obtained through the research grant mechanism are often used to subsidize both teaching and patient care.

(6) The importance of federal hospitals, particularly Veterans Administration hospitals, as resources for teaching and graduate training, ought to be acknowledged. Institutions that do not enjoy access to V.A. hospitals generally require their faculty to do additional clinical practice, often to the detriment of their teaching and research. As the budgets of the Veterans Administration are cut, with funds earmarked for research being progressively reduced, the advantage that the V.A. hospitals provide to their parent medical schools is slowly eroded; these schools may soon become increasingly dependent on income derived from paying patients.

(7) As federal funding becomes curtailed, it is apparent that university support forms too small a segment of the budgets of departments that carry a major share of the academic load, particu-

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larly of departments of medicine. Deans and other administrators need to realize the enormous contributions that these departments (and other similar departments such as pediatrics, psychiatry, and neurology) make to teaching and training; they ought to receive a more equitable part of the state or endowment budgets.

RESEARCH AND THE INDIVIDUAL INVESTIGATOR

Quantitative Considerations—Publications suggest that the number of clinical investigators (physicians) has gradually diminished.[2] Studies from the NIH and the Association of American Medical Colleges (AAMC) have received wide publicity. There is no reason to doubt statistics which suggest that there are fewer research trainees today than in the recent past. They do not, however, answer the question whether the baseline against which the comparisons are made suggests that the number of individuals in training today are too many, or too few. We know that there has been an absolute decline in clinical investigators; we are less certain what this portends. Also, if the information made available through the "National Manpower Study in Internal Medicine"[3] is believed, the number of academic physicians in internal medicine appears to be increasing; by 1990 they may be in surplus.

If we assume that most academic physicians entering internal medicine will have some sort of subspecialty training, a trend in the number going into academic medicine can begin to be discerned. Fellowship training in internal medicine is characterized by three distinct tracks. One, lasting two years, divides the trainee's time between the clinic and the laboratory; a second, a clinical track lasting a year or two, is one in which the trainee spends all his time in clinical consultative work; an academic track, lasting two to three years, is characterized by a significant portion of training in the laboratory. One of the ways in which we can estimate how many academicians there are likely to be in the future is to survey the number taking *three* years of training. Three years are unnecessary for anyone wishing to practice a clinical subspecialty in internal medicine, and most three-year fellows may be expected to opt for a career in academic medicine, characterized at least in part by a commitment to research.[4]

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Between 1975 and 1979 the number of third-year fellows in training more than doubled, absolutely and relatively. Corroborative evidence comes from trainees who describe themselves as being in the academic track. In 1976, 10.5 percent were in the academic track, and in 1979 they numbered 15.5 percent. Even if some in the academic track go into practice, most will opt for academic medicine; even if there is attrition, those entering the academic world from the two-year track may be expected to offset the loss. No matter how the data is read, the number of academic physicians is increasing.

Manpower projections for internal medicine[5] must start with the fact that, in 1980, there were between 55,000 and 58,000 internists in the United States. It is estimated, based on the steady percentage of graduates entering internal medicine and the training capacity of internal medicine, that, by 1990, there will be 110,000 internists; approximately 10 percent of these will need to be academicians. This suggests a demand for 10,000 to 13,000 individuals; however, the number of academic internists now projected to be fully trained in 1990 is 27,000. There will clearly be a surfeit of internal medicine manpower by 1990. The largest surplus will be among practicing subspecialists, but it seems that there will be a surplus of academic subspecialists as well. How can this be handled? Not, in my view, by having fewer training programs; rather, those opting for an academic career must be better trained and must expect to spend more time in study to meet the needs of modern science.

Although opinions conflict about whether a surfeit or dearth of faculty for basic-science departments is to be expected, my own view is that the cup will be full on the basic science, as well as on the clinical, side. My opinion stems from observations made of the number of fellowship applicants already in their third, fourth, or fifth postdoctoral year. While this desire for additional advanced training may be attributed to the need to prepare oneself to cope with the intricacies of modern science, it may also stem from the inability of advanced postdocs to find faculty positions. When as many as 200 applicants answer an advertisement for a lowly faculty position, there is evidence of substantial manpower surpluses.

Qualitative Implications—I worry also that the quality of academic medicine may be deteriorating.[6] The prototype, perhaps caricature, of the earlier medical academic is of a white male, independently

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wealthy, who trained in many places for many years; his training included the basic sciences of the day—pathology, microbiology, physiology and, more recently, biochemistry and cell biology. Such an academic married late in life, and had children even later. He expected to do research, teach, and to take care of patients only peripherally. Indeed, most patients with whom he came into contact were ward patients, primarily in the care of the house staff; as a faculty member he took clinical responsibility for only a few private patients.

His research was modest, supported largely by private philanthropy. There was little competition for dollars or for scoring priority with medical discoveries. Academic departments were small and collegial. Indeed, life for the academic resembled that of a professor of English or philosophy. His leisurely lunch might be followed by a game of billiards or bridge. Scientific conversation occurred over tea. He spent his summers at Woods Hole, Bar Harbor, Mackinaw Lake. The academic scene was populated by "B" types; the pace and nature of research made life genteel, particularly if the man had independent means; and if he lacked such income, he hesitated before choosing academic life. For those who were not rich, life was not easy; the pay was poor. Indeed, academic life was characterized as one of "threadbare gentility" by the former head of the orthopedics section at Yale who announced to his class one day that he had had enough of such gentility and had decided to go into practice. He believed that his technical skills, which did not involve much laboratory research, were worth more than what Yale was paying him; he left for what he thought to be the better life of private practice.

The Changing Economics of the Academic Physician—Many today who do not consider themselves old, signed on for their first faculty jobs at $6,000 a year or less. In 1958, I declined an assistant professorship for $6,500 to take one for $8,500; I considered myself very fortunate. How can this be compared with conditions that exist today? Table 1, on page 108, taken from AAMC data, compares mean salaries for assistant, associate, and full professors during the 1978–1979 and 1983–1984 academic years. While faculty incomes for 1978–1979 were adequate, they increased appreciably during the next five years. Although they provided substantially less than what might be expected from private practice, they were in no sense

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TABLE 1. Mean Salaries for M.D. Assistant, Associate, and Full Professors 1978–79 and 1983–84*

	Assistant Professor		Associate Professor		Professor	
	1978–79	1983–84	1978–79	1983–84	1978–79	1983–84
Anesthesiology	56.6	91.5	67.8	108.0	75.3	121.1
Dermatology	40.6	71.2	56.0	77.3	60.7	99.4
Family Practice	43.6	61.4	51.9	73.0	55.9	81.7
Medicine	43.3	61.6	52.2	77.9	60.6	91.0
OB-GYN	47.9	76.2	59.2	96.2	68.0	108.7
ENT	58.7	84.5	71.3	118.7	76.4	124.9
Pathology	42.4	60.2	56.6	75.7	60.9	89.5
Pediatrics	38.2	55.6	45.8	68.5	56.7	81.5
Psychiatry	43.2	62.0	53.0	72.4	60.6	89.1
Radiology	52.4	77.8	64.3	96.7	75.3	116.9
Surgery (General)	54.0	87.4	68.8	111.5	78.2	128.9
Surgery (Plastic)	58.4	99.6	72.7	125.5	103.8	154.9
Surgery (CV)	73.1	111.9	97.3	142.8	108.1	170.5
Orthopedics	58.5	101.8	74.5	120.5	86.2	142.8
Urology	54.1	86.6	69.7	101.8	78.2	129.3

SOURCE: Association of American Medical Colleges, *Report on Medical School Salaries 1978–9* and *1983–4*.
*Salaries are in thousands of dollars.

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derisory. In Tables 2, 3, and 4 (on page 110) selected academic salaries for five typical specialties are given: internal medicine is similar in many ways to pediatrics and psychiatry; pathology in many medical schools is a cross between basic-science and clinical departments; radiology is the very prototype of a service department; general surgery; obstetrics and gynecology; and at the top of the scale, cardiovascular surgery, similar to orthopedics, ENT, and ophthalmology. Table 2 shows that even at the lower end of the scale, the twentieth percentile, income levels are reasonable—a range of $50,000 to $77,000 for assistant professors; $63,000 to $92,000 for associate professors; and $78,000 to $112,000 for full professors. At the fiftieth percentile (shown in Table 3), the figures improve markedly and range from a low of $58,000 for assistant professors of medicine to $100,000 in cardiovascular surgery, with comparable ranges of $74,000 to $122,000 for associate professors and $89,000 to $147,000 for full professors. At the upper end of the scale (Table 4), pathologists start at $69,000 and cardiac surgeons at $161,000 as assistant professors; the associate professor range is $86,000 to $192,000; and at the professor level, salaries run from $103,000 to $204,000. Since most schools strive to achieve status by being in the eightieth percentile, the figures presented in Table 4 are probably the most significant.

Such salaries, although much improved, still fall appreciably below those that are regularly obtained in private practice. Even where academicians, and in particular successful investigators, earn honoraria, royalties, and consultation fees, which together make up a significant fraction of the income they receive, the fledgling practitioner has one major advantage over them. His income tends to rise much more rapidly. Though both may start at a comparable level, the practitioner usually doubles his take-home pay within three years as his practice grows, while the academician's income will generally rise by between 5 and 10 percent a year. But even here there are tradeoffs. Most academicians enjoy significantly better fringe benefits, including retirement plans where the individual's contribution is usually matched by the university or the hospital. In addition, hospitalization, medical, travel, and disability insurance may be guaranteed; not infrequently, dues to societies are paid, as well as travel to meetings and costs of journals and books. Liability (malpractice) insurance is not often paid directly by academics; this may be the most generous

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TABLE 2. Twentieth Percentile of Selected Academic Salaries: All Schools (1983–84)*

	Assistant Professor	Associate Professor	Professor
Internal Medicine	50	63	78
Pathology	50	64	75
Radiology	65	83	100
General Surgery	65	84	98
OB-GYN	59	74	55
Cardiovascular Surgery	77	92	112

TABLE 3. Fiftieth Percentile of Selected Academic Salaries (1983–84)*

	Assistant Professor	Associate Professor	Professor
Internal Medicine	58	74	89
Pathology	59	75	89
Radiology	76	95	116
General Surgery	80	101	124
OB-GYN	72	90	106
Cardiovascular Surgery	100	122	147

TABLE 4. Eightieth Percentile of Selected Academic Salaries (1983–84)*

	Assistant Professor	Associate Professor	Professor
Internal Medicine	71	87	103
Pathology	69	86	103
Radiology	89	109	133
General Surgery	101	129	155
OB-GYN	85	105	125
Cardiovascular Surgery	161	192	204

SOURCE: Data for Tables 2, 3, and 4 are taken from the Association of American Medical Colleges, *Report on Medical School Salaries 1983–4*.

*Salaries are in thousands of dollars.

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fringe benefit of all. While physicians in practice who have incorporated themselves may also enjoy such benefits, incorporation is a relatively new development. It must also be remembered that the corporation pays such benefits from its own earnings. In other words, the practitioner is himself paying for these benefits; in an academic setting, the contributions are made by the university or the hospital.

These personal income statistics cover both M.D. clinicians and M.D. investigators, and the question can be raised whether there are not major discrepancies between these two types of faculty. Some would say that the clinicians earn appreciably more and that the averages given in the tables falsely elevate the incomes of researchers while unduly depressing those of clinicians. The AAMC data, on which Tables 1–4 are based, do not conclusively settle this question. In 1983, in response to complaints of some faculty that clinicians' incomes exceeded those of investigators, the two were compared; in non-surgical clinical departments, investigators' incomes came to within 1 percent of those of clinicians. In those same departments, the highest incomes in the professorial ranks were earned by investigators, primarily because they were able to combine healthy university salaries with grant funds earmarked for their own salary support.

The Changing Academic Environment—While it is difficult to argue with data that show an appreciable increase in academic incomes, the question of whether the academic's life remains a bastion of gentility is a reasonable one. In my view, it is not, in part because the life no longer fulfills the academician's own expectations.

Many factors lead an individual to seek an academic career. The love of discovery is sufficient to keep many academics in research. There is also the love of teaching. The desire to practice medicine in a setting of intellectual excitement that is provided only by house staff and students may be compelling; so also there is the stimulus to excel, to prove oneself in an academic setting. The collegial milieu provided by a laboratory, clinic, or bedside in a medical school or teaching hospital is appealing; so also is the love of, and desire for, fame and prestige. Though some may wish to deny it, such ambition is a major cog in the academic machinery.

To what extent are all such expectations realized? While many are indeed called to the bench, few in fact are chosen; and only a very small minority are sufficiently talented or lucky to win a Nobel prize,

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secure election to the National Academy of Sciences, or make a discovery that is recognized as a real breakthrough. Most academics engaged in medical investigation are required to till the soil without hope of bringing home a rich harvest. Most do research for the sake of doing it; to a large extent, for self-gratification. While there is nothing intrinsically wrong with being primarily motivated to do research to profit one's own ego, such a motive does not fit well into the competitive setting of contemporary science in which most investigators are compelled to work. Grants are hard to come by; priority is given to those who are first in having an abstract in press, or a paper presented at a national meeting. This emphasis on the big hit—the major breakthrough—has contributed, in my opinion, to the growing incidence of scientific fraud that has done so much to disfigure the academic scene. Getting the grant seems to count for everything. In this competitive atmosphere, the young investigator who is not successful in obtaining a first grant, or even a second, is likely to become frustrated or angry. This frustration, I believe, may be the largest single deterrent that keeps young people from entering the academic arena. Science becomes a hassle rather than a source of satisfaction. The enterprise is just not as much fun as it once was.

This diminished pleasure in research may extend to other parts of academic life. Teaching has become less gratifying. Classes are larger; direct student-faculty contact appears to be a thing of the past. The curriculum is more complex. Many instructors teach in a vacuum, shuttled in and out of courses to deliver a specific lecture without knowing what the gist of the entire course is—hit and run teaching, in short. Few are able any longer to teach an entire subject. Teaching has become more substantially regulated. It is no longer the instructor who is important; it is the teaching committee.

Patient care may also be less gratifying. There is more to be done and it has become much more bureaucratized. Notes are stamped, initialed, and signed simply for the sake of complying with regulations. While some realize that patient care must become a more important part of the academic scene precisely because it is the source of a progressively larger slice of the faculty member's income, there are many frustrations in trying to practice medicine in an academic institution. Care may have to be provided at a substantially higher cost to patients because the teaching hospital's overhead is considerably greater than that of the physician's office. Facilities are often

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inadequate, with insufficient or ill-qualified help. High operating costs and inferior facilities, together with severe time constraints imposed by other duties, doom academic doctors to failure. Conscious of the importance of patient care, the physician is frustrated by his inability to provide it in an optimum fashion.

What needs to be written about the intellectual stimulation, said to be part of academic life? To be sure, it is still there. Most teaching institutions still have grand rounds, seminars, lectures, and conferences that help to provide an exciting intellectual environment. The trouble is that most faculty and, for that matter, most students have neither the time nor the inclination to participate in these scholarly offerings. A member of a campus-based medical faculty in a clinical department rarely has the time to attend a seminar in the law school or the business school; nor is he likely to find his way to a concert or play on campus. Although he may work in a university, he might as well be on some remote desert island. It takes exceptional effort for a faculty member of a clinical department to take advantage of the intellectual offerings of the university.

The benefits of collegiality are, in my view, greatly exaggerated; the size of the modern medical school almost precludes it. As academic departments have grown and become divisionalized, it is increasingly difficult for the faculty member to mingle with his colleagues. Moreover, his interests are all too often thwarted by departmental barriers. It is difficult to seek out a colleague whose laboratory or office is half a mile away, whose clinical and administrative obligations are certain to fill his day.

Are fame and prestige still real lures for the academic? Rewards continue to come to successful investigators who see their names in *Proceedings of the National Academy of Science, Science,* or the *Journal of Clinical Investigation,* and who regularly appear on the scientific programs of the international congresses and workshops held in Venice, Acapulco, or Marakesh. It is amazing that a tiny cell like a leukocyte can be the subject of so much scientific talk in so many exotic places by so many of the same people. But fame and fortune for the clinician/teacher is less easily come by. An occasional dazzler may rise above the crowd; most do not. It is important to reward the faculty soldier who fights in the clinical trenches, the faculty martyr tapped for major bureaucratic functions. Someone needs to sit on human subject review committees, and on boards that

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deal with medical practice plans. Occasionally, somebody gets rich in devising such a plan, but no one, to my knowledge, has ever become famous.

Unfulfilled Expectations—Academics may expect too much of academic medicine. They crave the gentility of yesterday, the income of the cardiovascular surgeon, and the kudos of the molecular biologist who clones a new gene.

Can these complaints be countered? Only if the extraordinary advantages of academic medicine are recognized. For one thing, there is exceptional security that comes with academic tenure. Though tenure may be a deterrent to progress,[7] it is a great advantage to those who enjoy it. It is unfortunate that the good have no need of it, that the mediocre use it as their shield. But it is part of the academic scene, unlikely to be replaced in the foreseeable future.

I would argue also that academic medicine remains exciting. Discovery of new knowledge, even if it is considered trivial, is rarely trivial to the individual who discovers it. More than that, treating patients and helping them can be gratifying; dealing with young medical students is always that. Even travel to meetings, or visiting professorships, adds spice and variety to the academic's life.

Many in my generation feel that academic medicine has provided us with a wonderful career. Some would say that the academic world has given us more than we have given in return and certainly more than we ever expected. And that, incidentally, includes money.

While the modest expectations of the academics of my day may seem anachronistic in the light of present-day living, future faculty members must be willing to set realistic goals for themselves. Indeed, the system must bring its own goals for academic medicine into line with reality.[8] The individual and the university must realize that the day of the triple-threat academic is over, is as defunct perhaps as one-platoon football. We live in an era of specialists; this must be reflected in clinical departments by two cadres of faculty—the clinician/teacher and the investigator/teacher. There needs to be room for both, and rewards for both. It is unrealistic to expect the clinical investigator to stay at the top for the whole of his career, or even to remain in the same clinical field. We must use more skill in career planning and retraining, devising the flexibility that will permit

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thoughtful, well-planned retirements—in some instances, even early retirements.

FURTHER ISSUES PERTAINING TO RESEARCH

A mystique has grown up around medical research that warrants some examination:

Researchers are Better Teachers—In my peripatetic experience, I have visited a great many medical schools and hospitals as visiting professor, accreditor of residency programs, site visitor for the American Board of Internal Medicine, consultant to search committees, and the like. There are now many programs in internal medicine that boast a full-time faculty whose members show great skill in teaching, but that do no significant research. Some exist in our community-based affiliated teaching hospitals, particularly in the eastern parts of the United States. These hospitals will generally have a department of medicine, consisting of between six and ten faculty, whose principal obligation is to teach the medical students and house staff. Many of these hospitals have excellent academic programs; their faculty is not involved in research. The U.S. Army Medical Corps also boasts a group of distinguished teaching hospitals whose permanent faculty, by and large, do no research. While no one denies that the investigator is in the position to bring the fruits of his research to his teaching and that this may help the field as a whole, the investigator is unlikely to make major contributions to teaching. Clinical investigation is a full-time endeavor, highly competitive, sophisticated, and often technically demanding; it does not leave a great deal of time for teaching or for the care of patients. While the full-time investigator can give lectures and seminars in the area of his expertise, putting in the long hours required for patient care is quite another matter.

Research-Intensive Schools are Better Medical Schools—The evidence to support this statement is not very compelling. While the prestige of a medical school is determined by the research fame of its faculty—the number of grants received, the number of papers written, the number of textbooks edited, the number invited to serve as visiting lecturers or visiting professors, the number elected to research-oriented societies—such fame is almost never correlated

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with the quality of instruction offered to its medical students. It is worrisome to note the lengths to which some institutions are prepared to go to preserve their research enterprise in the face of severe cutbacks in funding. In many instances, extraordinary efforts are made to prepare failing laboratories to cope, when a more reasonable course would be to reapportion shrinking resources among those investigators who continue to be genuinely productive.

Researchers are Better Clinicians—Few believe this. In fact, some of the worst clinicians in medical schools are those who spend eleven months of the year in the laboratory, coming out annually to spend a month waving their clinical wands over patients. Their patients deserve better. The problem is exacerbated today when technology and changing emphasis on therapeutics is so critical a part of clinical medicine. While individual investigators continue to be superb clinicians because they work at it, both patients and faculty would be better served if the really good investigators remained in their laboratories.

All Academicians Must do Research—I have written elsewhere on the concept of the dual faculty—the two-platoon system consisting of investigators/teachers on the one hand, and clinicians/teachers on the other.[9] Such a system implies that not everyone on a faculty will be required to do research. The idea has not been well received. Many universities, including some of the most distinguished, feel that it is part of their mission to generate new knowledge. While I agree with this in principle, the question remains whether every member of the faculty has to fulfill this role, particularly since medical schools are more and more required to provide a community service in the form of patient care. At the moment, appointments and promotions committees pay little heed to the quantity or the quality of clinical services rendered; they insist on research, even if that research is pedestrian. While clinicians are capable of excellent scholarship and should be encouraged to engage in it, the university or its medical school cannot expect clinicians to produce research of the same type or at the same rate as investigators who spend most of their time in the laboratory. This implies that full-time clinicians must be accorded academic equality. Their titles may differentiate them from their investigator counterparts; such titles as professor of "Clinical Medicine" might become common. Alternatively, a decision might be

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made not to differentiate them at all from their clinical colleagues. As a tradeoff for this change in status, clinicians in medical schools should forfeit tenure; they do not really need it.[10]

Modern Research is Easy—While many of us grew up in an era when we could be at the bench and still do our own thing, modern scientific investigation requires a critical mass of researchers who are in a position to help one another. It may not be possible for every institution to afford such a critical mass, but without it the technology now essential to perform modern science cannot be utilized fully. Modern science is a highly sophisticated technologically oriented endeavor; the solo investigator in his soiled laboratory frock is as defunct as the bearded physician carrying his little black bag.

Research Is a Financial Boon to the Institution—The university, or the teaching hospital, can no longer be expected to subsidize the research enterprise. While faculty members complain bitterly about the university's overhead on grants, it is in fact a legitimate cost of doing research. More and more research is being subsidized by practice income. This is a very unlikely source for research support in the future, except perhaps in a few high-earning specialties. Nor can shrinking institutional funds be expected to underwrite research costs. Many institutions today can barely pay their teaching costs from state appropriations or endowment income. There is no way out of the dilemma of the increasing institutional cost of research except to ask that research be seen as a tub on its own bottom, self-supporting, fully responsible for both its direct and indirect costs.

Not all medical schools need to do research. Some ought to exist primarily to train medical students and clinicians and, as long as they do that well and assemble a first-rate clinical faculty to do it well, they should not be expected to do more. Not all faculty within a medical school need do research.

Medical schools that encourage research should do so selectively, intensively. Not every subject need be covered. There ought to be areas of strength, but not in every discipline or subdiscipline.

Research ought to be more collaborative. There is little justification for duplicating research in the medical school and in other parts of the university. Where complementary research groups and departments exist, they should be built with an eye to collaboration. When

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several medical schools exist in a single community or in close proximity, such collaboration should be fostered. The same is true for medical schools and research institutes. Finally, in selected instances, collaboration between industry and medical schools needs to be promoted.

Research must be self-supporting. While the generation of new knowledge is indeed the mission of the university, the university can subsidize this mission in only a limited way.

Some research enterprises need to be contained in size. Where investigators spend their lives chasing the dollar, institutions become altogether too expansive. Big research is not necessarily good research.

Clinical investigation will continue to be part of the academic scene, but just as there will be constraints on the way in which we teach medicine and the way in which we practice it, there will be constraints on the way in which we do research. This is not necessarily bad. It forces the academic establishment to examine its medical schools and their missions; it mandates the medical schools to evaluate what they are doing and what their true values are.

ENDNOTES

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[4]Harry N. Beaty, David Babbott, Elizabeth J. Higgins, Paul Jolly, and Gerald S. Levey, "Research Activities of Faculty in Academic Departments of Medicine," *Annals of Internal Medicine* 104 (1986), pp. 90–97.
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[7]Petersdorf, "The Case Against Tenure in Medical Schools," *Journal of the American Medical Association* 251 (1984), pp. 920–924.
[8]Petersdorf, "Is The Establishment Defensible?" *New England Journal of Medicine* 309 (1983), pp. 1053–1057.
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Robert J. Blendon

The Problems of Cost, Access, and Distribution of Medical Care

A STUDENT ASKED WALSH MCDERMOTT in the year before his death what he thought were the most profound and far-reaching changes in medicine during the last half century. Walsh replied that three changes had most transformed the world he had known as a medical student. They were the discovery and development of antimicrobial drugs; the explosive advances in molecular biology and genetics; and the near universal health insurance coverage of the American population. He felt that the importance of the latter development was not well understood by physicians. For, in fact, the widespread adoption of health insurance over the last forty years had been the major force behind making modern scientific medicine generally available to the nation's middle- and lower-income citizens.

This essay explores the latter phenomenon: America's struggle to achieve universal health insurance coverage for its population, and the problems this has solved, created, or left unanswered. Specifically, this paper examines: (1) the serious problem of access to medical care that existed when Walsh McDermott was a young physician and health insurance was generally unavailable; (2) the very different role the United States government played in attempting to solve these problems from that played by European governments; (3) the mixed success of America's pluralistic health system; and (4) the principal unwanted side effect of making widespread health insurance available—exploding health-care costs.

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Walsh McDermott's contemporaries were the first to confront widespread public anxiety about how Americans would pay for the cost of their medical care. The reasons for this were simple. Until the late 1920s, medical care was relatively inexpensive—medical education was short, tuition was low; there were very few significant drugs, diagnostic or therapeutic agents available; medical specialists were rare, and hospitals were not often used by physicians in the care of their patients; doctors generally treated their patients in the office or at home. As late as the mid-1870s the country had only 180 registered hospitals caring for less than 150,000 patients during the course of the year.[1]

By the 1930s, medical practice had changed dramatically. As a result of a number of major scientific advances, it became increasingly dependent on modern hospitals. New discoveries in medicine meant the doctor could no longer carry his armamentarium around with him. He had to rely increasingly on hospital-based x-ray facilities, diagnostic laboratories, modern operating suites, around-the-clock professional nursing care, and in-hospital drug and nutrition therapy. By then there were 6,400 hospitals nationwide, many with growing technological sophistication, and more than six million Americans were using them as patients each year. The scientific progress that had made medical care increasingly useful had at the same time, made it more costly, because patients were receiving a much greater part of their care in hospitals.[2]

The problems Americans faced in paying for their hospital and medical care were greatly accelerated by the devastating impact of the Great Depression. In the 1930s, fewer than 10 percent of Americans were protected by health insurance. Many patients therefore faced serious financial problems in obtaining health care. As a result of falling personal incomes during this period, many recently built hospitals found themselves facing bankruptcy or sharp curtailment of their services because patients were unable to pay for treatment. Studies showed that the cost of illness fell unevenly over the nation's families—10 percent of families bore 41 percent of all medical expenditures, while 58 percent bore only 18 percent. In the course of a year, half the population would experience no serious illness, while 10 percent would be very ill, having to pay the unpredictable costs of their treatment from savings or borrowing. With the unemployment rate high and family incomes insecure, studies of personal loans

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showed that the chief reason families borrowed during this difficult economic period was to pay medical bills. Unlike other household necessities, health-care expenditures could not be budgeted precisely, because the cost of medical care which might be needed could not even approximately be anticipated.[3]

Most major American cities had "free" public hospitals, and voluntary charities raised considerable sums to underwrite medical care, but millions of Americans had very limited access to health care because they were uninsured. Studies showed that the frequency of illness among the poor was much higher than among more well-to-do families. But, in the 1930s, physicians treated those in the highest income groups two-and-a-half times more frequently than the poor.[4]

It was not only the poor who were unable to pay for medical care, but also middle-class Americans. In the 1930s, the hospitalization rate for the population as a whole was half of today's; although the elderly suffer illness more frequently, they were admitted to the hospital at about the same rate as Americans in general; likewise, southerners, blacks, and rural Americans very infrequently received treatment in the hospital.[5]

By the end of World War II, modern scientific medical care was developing at a rapid and costly pace. Fifteen million servicemen and their families had been exposed to improved medical care either through the services or some other government-related wartime medical program. The fact that less than 4 percent of the wounded who received medical treatment actually died was not lost on the American public, and, in the postwar years, Americans were unwilling to return to the inequitable conditions of the 1930s. It became clear that, unless some mechanism could be found to finance better the unpredictable and sometimes bankrupting costs of serious illness, the fruits of medical science and improved medical education were not going to be available to large segments of the American population.

In the postwar response to the problem of high and unpredictable medical bills, the role of the U.S. government in financing and providing personal health services diverged markedly from that of most European governments and of Canada. While one European country after another adopted government-sponsored national health insurance or instituted a full national health service, America's

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health-care arrangements were substantially different. The federal government played a much less significant role.

To understand the reasons behind this requires an awareness of the broader national forces outside medicine that helped shape the government's response to the nation's medical needs. Since the end of the Second World War, there have been a few major shifts in public opinion, stemming in most instances from a growth of public anxiety about the general state of the nation that has significantly influenced the role played by government in the nation's health affairs; more importantly, these shifts have influenced the willingness of government to assist families with their problems of paying for their medical care.[6] Such shifts in public sentiment have helped determine the fate of the now eighty-year-old social movement to enact some sort of national health insurance program.

The first of the three major swings occurred during "The Launching of the Cold War." A response to a publicly perceived external threat coming from the Soviet Union in the late 1940s, with public anxiety greatly increased by events such as the Berlin Blockade, the Soviet detonation of an atomic bomb, the Korean War, and the launching of Sputnik—these and other such events significantly affected the tone and direction of the nation's politics in domestic as in foreign affairs.

The second major swing was produced by "The Civil Rights Revolution" of the 1960s, and was a response to a growing public sentiment for creating a society that offered greater dignity and equity to all citizens, most particularly to all minorities, the poor and the elderly being very conspicuous among them. These concerns developed from the Civil Rights' movement; they were politically potent during President Johnson's tenure, particularly in the period immediately following the assassination of President Kennedy in 1963.

The third major swing, less commonly noted, was produced by "The Stagflation Crisis" of the late 1970s, a response to a growing fear of what would happen to the American standard of living if continued inflation, growing unemployment, and declining industrial productivity became the order of the day. In this period, a weakening economy and rekindled concerns about the nation's defense capacity came to overshadow earlier enthusiasm for coping with human welfare problems.

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In medicine, in the early years of the Cold War, there was a dramatic shift in America's domestic political climate. This political change significantly influenced the outcome of the debate on national health insurance. At the end of the Second World War, when interest in some form of government-sponsored national health insurance was at its peak, there was a hope of early and important legislation. Support for compulsory health insurance had grown significantly during the Great Depression and during the war itself. The principle had been endorsed by many powerful groups, including those who planned President Roosevelt's Social Security Program, the prestigious private Committee on the Costs of Medical Care that sat during Hoover's administration, and most important, a presidential commission named by President Truman that reported in 1952.

Legislative activity in national health insurance had been delayed by the war, but late in the 1940s a myriad of proposals, including one supported by President Truman, were introduced into Congress. In what should have been a very propitious time for change, America's political horizons were suddenly altered by the public's response to the Cold War. Because public opinion insisted that a major effort was required to counter the Soviet threat to the security of the West, new issues came to the fore; indeed, a new leadership emerged in public life, particularly in Congress. Many of these men and women were committed not only to major increases in defense spending, but, increasingly, they resisted the incursion into American domestic life of what they viewed as Soviet-like or Soviet-inspired economic and social policies. Ideas of governmental economic planning, the nationalization of industry, "cradle-to-grave" welfare, and, of course, national health insurance were anthema to them.

In this new political environment, with the contentious national debate that now occurred, many of the nation's practicing physicians, hospitals, and insurers emerged as prime resisters to any plan that would favor compulsory government health insurance; their policy was to gain support for a voluntary private approach.

While the retreat from some form of national health insurance did not preclude the gradual adoption of a national policy supporting health insurance,[7] it set the country on a two-track system: private health insurance for the employed and their families; public insurance for the unemployed and the retired. A quarter-century after this decision, the nation had, in effect, a program of tax subsidies for

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employees with private insurance, and three public sector programs for the unemployed and retired: (1) compulsory health insurance for the aged; (2) a noncontributory, federal/state insurance program for the poor; and (3) a system of over 1,000 governmentally subsidized community health centers located in low-income, medically underserved communities. This system was never universal, nor was it comprehensive. In some communities, it provided access to the same physicians and the same hospitals for individuals of every income and race; in others, separate institutions developed for the poor, for minorities, and for the unemployed. Still it was something of a system, and with only marginal changes, it protected a great part of the American public against the unpredictable costs of illness; it provided access to basic health care.

Resistance to government support of health programs never precluded the launching of smaller public programs where there was a clear need. The Hill-Burton Act (1946), for example, provided federal subsidies for building and improving facilities in voluntary hospitals, particularly those situated in rural areas. While the Depression and the Second World War had not led to major resources being made available for modernizing existing hospitals, building new ones, or renovating old ones, the Hill-Burton Act not only served to revitalize the facilities of the voluntary hospital sector, but was the first attempt by government to stimulate some sort of community health planning.

During the second major public opinion shift, associated with the Civil Rights Revolution, the nation saw the large-scale institution of public insurance, together with a dramatic increase in the budgetary contribution of both federal and state governments to the health sector, particularly as these involved the care of the poor and the elderly. There were also vast new expenditures for the expansion of health professional schools. A growing recognition of the fact that neither private sector efforts nor earlier public programs had given the poor, certain minorities, and the elderly equal access to health care led President Johnson in 1965 to press for the enactment of Medicare (to help the elderly) and Medicaid (to assist the poor). As a result of this sweeping legislation, all of America's elderly and one-half of the nation's poor were entitled to receive publicly supported health insurance benefits.[8]

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For those who had been seeking to move the United States from being the only major industrialized country in the world without universal health insurance, Medicare and Medicaid were a major step forward. Ten years after the enactment of this legislation 85 percent of Americans had some form of public or private health insurance; 75 percent had insurance to protect against catastrophic illness, including a special government program intended to help those with chronic renal failure. This insurance, together with special government or philanthropic subsidy programs, was sufficient to cover almost two-thirds of all the costs of health-care services. This left some 15 percent of the population (35 million people today) as the "charitable" responsibility of state and local governments and private philanthropy. These individuals had no financial resources to pay for their own care;[9] they depended on more than 1,000 publicly subsidized community health centers located overwhelmingly in low-income communities and on a major expansion of subsidized outpatient services by many of the nation's larger urban hospitals.

For many health planners, the longer-term agenda remained the old one—the enactment of some form of universal national insurance. They believed that the institution of such a program would protect the remaining uninsured population while, at the same time, reducing the direct responsibility for the remaining third of the health-care costs for which individuals remained accountable. This was thought particularly important because health insurance, as it evolved in the United States, did not adequately insure for less costly out-of-hospital health services, nor for nursing-home care; nor did it cover the full costs of less common catastrophic illness for about a quarter of the population.

The third major shift in public opinion resulted from the nation's "stagflation crisis." The shift began to occur in the later years of the Carter administration, and had the effect of redirecting federal and state government actions toward a new set of national economic and social priorities. The shift focused the government's attention increasingly on the private industrial system; it was overwhelmingly concerned with reducing inflation. To cure the country's industrial problems and to lower taxes, dramatic reductions in public social welfare expenditures, together with a moratorium on new social legislation and strict limits on public regulatory efforts for social

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purposes (environment, workplace safety, consumer protection, and the like), were seen to be necessary.

In health care, this new shift had four main consequences. First, it resulted in a *de facto* moratorium on proposals for national health insurance and for efforts to expand the Medicare and Medicaid. Second, it led to the government's agenda being overwhelmingly dominated by one concern—to reduce costs of medical care. Third, it caused restrictions to be placed on public sector spending for programs that exclusively served America's poor and elderly. Lastly, it precipitated a major change in the government's attitude towards medicine itself. Public policies are now gradually shifting so that health care appears as just one more private sector activity within the general economy. The new policies can be seen in the end to the ban on advertising by health professionals; the large curtailment of government health-planning and regulatory activities; the encouragement of profit-making hospitals; the use of government tax and expenditure policies to encourage "market forces" and to foster "competition" in medicine.

Since World War II, these three major shifts in America's health policies have led to the development of a highly complex health-care system, characterized by multiple sources of funding, with many points of major decision-making. Despite the absence of a national health insurance program or a strong central governmental role in the planning and direct provision of health services, comparable to what now exists in Europe, substantial progress has been made in addressing the problems of access to care and distribution of services.

The nation's long-standing doctor shortage has ended. Immediately after World War II, criticism was leveled at the country's medical schools for their failure to increase the numbers of young people they were training as doctors. The United States seemed to rely increasingly on physicians trained in other countries. Beginning in the early 1970s, however, American medical schools increased the numbers of physicians they were training. This expansion, by 50 percent, has been so successful that recent reports by a national commission on physician manpower and new surveys of practicing physicians suggest that, as the country moves towards a goal of 220 physicians for 100,000 people in 1990, it may in fact overshoot its projected national physician needs.[10]

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This rapid growth in the number of physicians, together with improvements in health insurance coverage, has substantially alleviated the nationwide problem of gaining access to medical care. Physician care is now more readily available to those who need it, particularly America's poor and elderly—groups with the heaviest burden of serious illness. As noted in Figures 1 and 2 (next page), in 1931 and 1964 low-income Americans saw a physician and were hospitalized substantially less frequently than those with higher incomes.[11] Today, however, this inequity is much reduced. High-quality hospital care is now affordable for much of the nation's middle class. Improved insurance has led to the virtual doubling of hospital usage since the 1930s. A recent study suggests that 78 percent of Americans now say that they have a personal physician whom they can identify by name. Projections developed from this data, together with a broad survey showing what physicians actually do, suggest that such a relationship may be enjoyed by as many as 94 percent by 1990.[12] (See Figure 3 on page 130.)

Studies also show that, as the supply of physicians grew during the 1970s, medical and surgical specialists diffused into many of the smaller rural communities. In 1979, nearly every town with a population of more than 2,500 could claim a physician in residence. Many of the more serious problems rural citizens historically experienced in obtaining adequate medical attention have been resolved. Today, rural Americans are admitted to hospitals at higher rates than their urban neighbours; they see physicians almost as frequently as those who live in metropolitan areas.[13]

It is important to keep in mind, however, that the overall data concerning the health care of the poor masks a very different reality for the poor who remain uninsured. Findings from recent studies suggest that being poor in America no longer is a major deterrent to obtaining adequate care; being uninsured is. To be uninsured and poor is the most serious problem of all. In a recent survey, 300,000 uninsured families reported that a family member was refused medical care for financial reasons. One million uninsured families reported that someone in the family required medical care, but failed to receive it for financial reasons. Nearly half did not even seek medical attention. Forty-three percent of uninsured families with a seriously ill member reported major difficulties in paying their health-care bills.[14]

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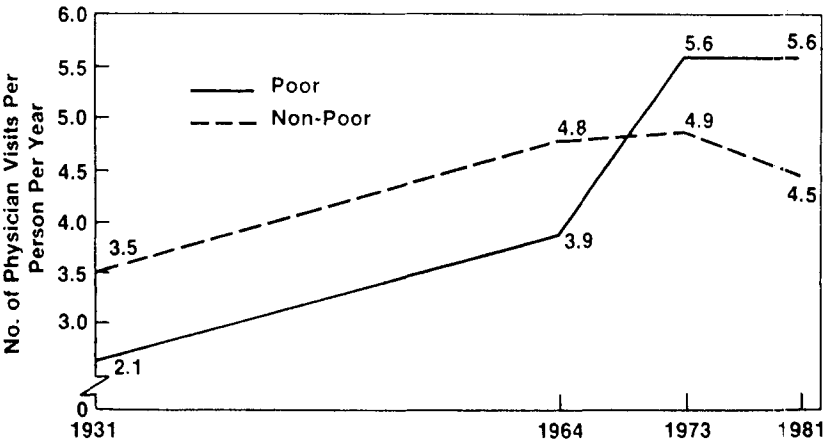
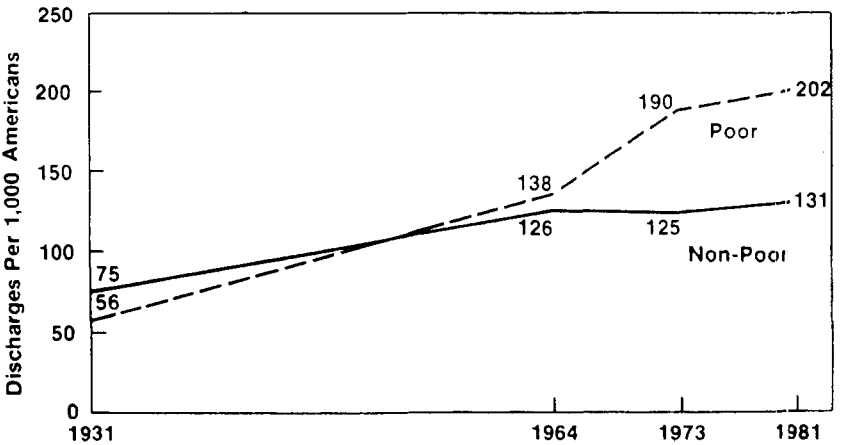
FIGURE 1. Per Person Physician Visits: Poor and Non-Poor 1931–1981



SOURCE: The Committee on the Costs of Medical Care, *Medical Care for the American People* (New York: New York Times Press, 1972), p.8; Robert W. Wilson and Elijah L. White, "Changes in Morbidity, Disability, and Utilization Differentials Between the Poor and the Nonpoor," *Medical Care* 15 (8) (1977), pp.636–646.

FIGURE 2. Hospital Discharges for the Poor and Non-Poor 1931–1981



SOURCE: The Committee on the Costs of Medical Care, *Medical Care for the American People* (New York: New York Times Press, 1972), p.8; Robert W. Wilson and Elijah L. White, "Changes in Morbidity, Disability, and Utilization Differentials Between the Poor and the Nonpoor," *Medical Care* 15 (8) (1977), pp.636–646.

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The uninsured who continue to lag far behind the rest of the population in securing adequate medical care include over a third of the nation's poor, many of them long-term unemployed workers; it embraces also many single and divorced women who are heads of families, the partially disabled, and many living in isolated rural communities. The failure to provide adequate medical care for these people remains a matter of serious concern.[15]

The second part of the story, of a more positive nature, occurred in tandem with the general improvement in access to care, and concerns the health of Americans during the last fifteen years as measured by falling death rates. While no real increase in life expectancy was achieved for any age group between the mid-fifties and the late sixties, leading some to wonder whether additional medical care made any real difference in human well-being or survival, in 1968 death rates began to decline steadily in the United States, and this has continued at a very rapid rate. Life expectancy increased more between 1968 and 1978 than it did during the preceding twenty years. By 1983, expectation of life at birth had increased by more than four years. Overall adjusted death rates for all Americans dropped by more than 20 percent, and there were significant reductions in death from ten of the leading fifteen killers. As a result, life expectancy in the United States today is at the same level as that of West Germany and Great Britain. Infant death rates for blacks have dropped almost 50 percent; and the differences in life expectancy at birth between white and black Americans have gone down from 7.4 years in 1960, to 5.6 years in 1983.[16]

Despite this undoubted progress, there is obvious room for improvement. The relative ranking of the United States within the family of nations is still substantially below what might be expected, given the country's general wealth and the very high levels of health expenditures. The U.S. today stands fifteenth in infant mortality, tenth in life expectancy. After seventeen years of continuing progress, black infant mortality rates remain twice as high as those of white Americans.[17]

Until recently, there was no data that demonstrated conclusively that higher spending for medical care and greater access to physician and hospital services had any major causal link with lowering death rates in the United States or with improving health. A recent study by the Urban Institute suggests that increased health expenditures in the

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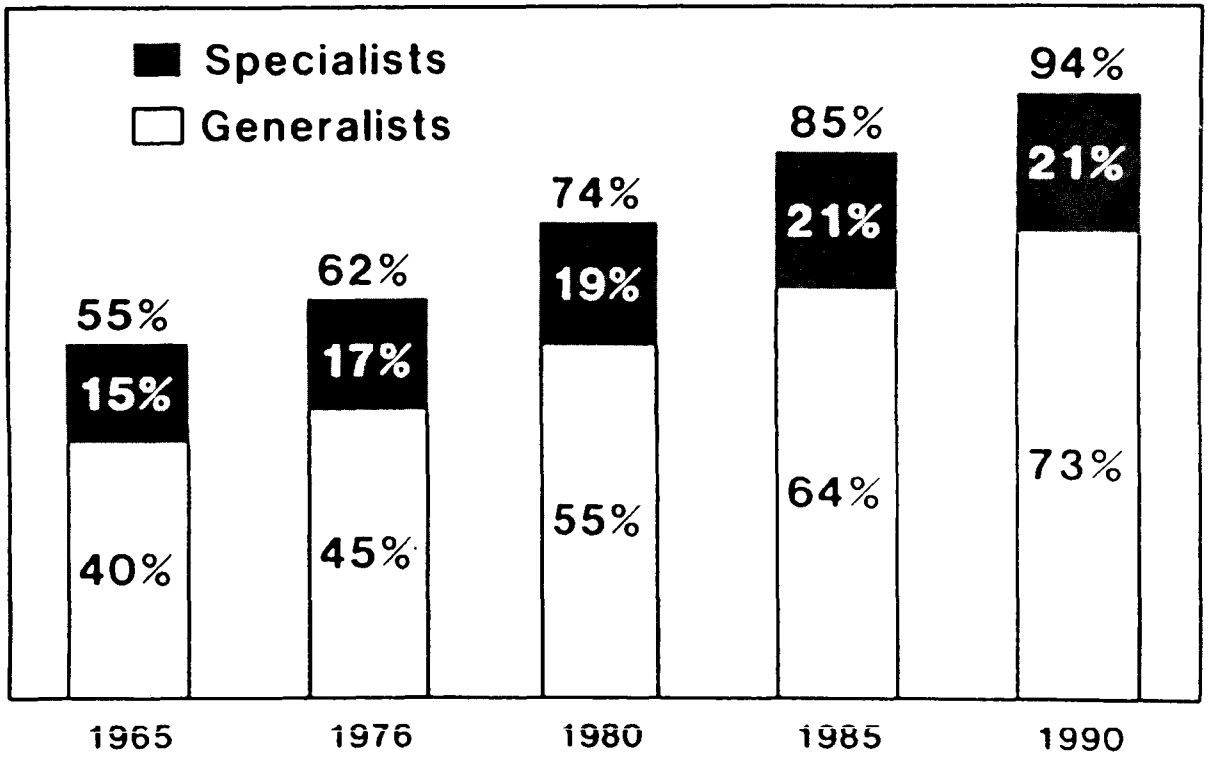
FIGURE 3. Availability of Physicians—Past, Present, and Projected



SOURCE: LuAnn Aday, Ronald Anderson, and Gretchen Fleming, *Health Care in the U.S.: Equitable for Whom?* (Beverly Hills, CA: Sage Publications, 1980); and Linda H. Aiken et al., "The Contributions of Specialists to the Delivery of Primary Care," *New England Journal of Medicine* 300 (1979), p 1369.

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1970s did contribute to falling death rates. The study provides figures that show that for every 10 percent increase in *per capita* national health expenditures, there has been a 1.6 percent drop in U.S. age-adjusted mortality rates.[18]

Still, changes in America's health and health-care system have not proceeded without producing unintended and unwanted side effects. As the great expansion of health insurance occurred, it was recognized that widespread insurance coverage in an unplanned health system resulted in exploding health-care costs. No one, at the end of World War II, anticipated that changing the way individuals paid for their health care would result in ballooning costs of health-care services. A $4 billion enterprise in 1929 has grown to be $400 billion in 1985. Even when inflation is taken into account, such figures are staggering. They were not foreseen, but once the financial barriers to obtaining medical care were removed, the cost of physician and hospital services rose rapidly. By 1971, national health expenditures, public and private, exceeded the annual expenditures for defense that the Vietnam War had necessitated. By 1986, expenditures for health care consumed more than one out of every ten dollars that Americans spent, almost double what had been common two decades earlier. Forecasts suggest that if current trends continue the nation will expand a staggering $2 trillion (or 14 percent of the GNP) for health care in the year 2000.[19]

Looking for a solution to the nation's growing medical cost problems, the first impulse was to call for voluntary, self-imposed restraints by both hospitals and physicians. Private agencies were asked to define and plan voluntarily for their community's health needs, to avoid expensive duplication of health-care facilities. Efforts were made to improve the management of the nation's hospitals. It was believed that, if hospitals had a "managerial revolution," reduced their inefficiencies, concerned themselves with their putatively low levels of productivity, health-care inflation might be brought under control. The United States invested heavily in voluntary programs calculated to improve hospital management.

For whatever reasons, these approaches were largely ineffective. Health expenditures continued to grow at an even faster rate. With the apparent failure of such voluntary efforts, Americans began to move away from their traditional assumption that medicine could

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regulate itself; the belief grew that there was a need for greater government control.[20]

As a result, the United States developed a whole series of novel interventions. The federal government, without taking over the ownership or operation of the major health-care institutions as was common in Europe, began to play an increasingly important regulatory role in the provision of medical care. It instituted limits on the proliferation of costly capital equipment and facilities; limits, also, on the use of the hospital. Restricting capital expenditures was a form of regulation termed "franchising." Prior to this regulation, hospitals had decided for themselves whether they wished to construct new facilities or to create new clinics. As a result of franchising, an external public agency was empowered to decide whether new capital facilities could be constructed in a particular geographic area. Limiting the rate of hospitalization, the second control device, was a form of regulation termed "utilization review." This form of intervention, developed in response to the growing belief that existing forms of health insurance encouraged expensive over-hospitalization, empowered external agencies to determine who should use the hospital and for what purposes. Neither of these efforts was successful; neither limited the growth of health expenditures, which continued to increase at alarming rates.

The Nixon administration, confronting a general economy with high levels of inflation and an unemployment rate higher than any since the Great Depression, undertook to institute wage and price controls. It did so from 1971 to 1974. This was the first time that such a dramatic expedient had been used in peacetime. The action gave the federal government unprecedented authority, including authority to determine the prices that private hospitals and individual physicians could charge.

The results of this intervention were dramatic. For the first time in a quarter of a century, hospital and medical care price increases fell below those of the overall cost of living. When federal controls were lifted in 1975, however, medical care prices jumped right back up to a level of one-and-a-half times the overall cost of living. The lessons of the period did not go unnoticed. Seven state governments, including those of New York and Massachusetts, adopted similar "mandatory" hospital rate-setting programs, and the Carter administra-

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tion tried, though unsuccessfully, to pass such legislation on a national basis.

In the late 1970s, the nature of the government's intervention in medicine began to change. The concern to improve the state of the overall economy and to lower the rate of general inflation led not so much to new regulation as to growing interest in "deregulation." Following proposals for deregulating airlines, telephones, trucking, banking, and natural gas, similar suggestions were made for medicine. Without regulation, some argued, health-care costs would be contained by marketplace incentives. The delivery of medical care through a system of competing health-care plans in specific communities seemed worth exploring. These organizations might take many different forms, but their common characteristic was their offer to provide a comprehensive medical service through a defined set of physicians and hospitals to a voluntarily enrolled population who paid a *per capita* fee (similar in many ways to what the Kaiser Health Plan in California, an organization with reputed lower health-care costs, offered its members). Individuals would choose among the competitive health-care plans on the basis of better service, lower premiums, reduced out-of-pocket costs.

The government moved also to change significantly the incentives offered individual hospitals. Rather than reimbursing institutions for the care of the elderly and the poor on a cost basis, each Medicare and Medicaid patient was assigned upon admission to one of 471 diagnostic groups (DRGs), and the hospital received a fixed predetermined payment, regardless of what it might spend on the care of the patient.

The long-term outcomes of these new government policies remain unclear. However, there are some signs to suggest what may be emerging. On the positive side, in 1984 the nation's health-care expenditures rose more slowly than at any time in the preceding twenty years, and health care as a share of the GNP actually fell slightly.[21] Across the country, hospital admissions fell; length of in-hospital stays declined; physicians' fees grew less rapidly. Much of this can be attributed to the sharp reduction in the nation's overall inflation rate. But preliminary evidence also suggests that the multiple changes made in the nation's health-care arrangements may have been important.

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Troubling problems also emerged. There are signs that the poor are encountering growing barriers when they seek care. A declining proportion of pregnant women are receiving early prenatal care, and there appears to be an increase in those receiving little or no service prior to delivery. With one-third of poor women of childbearing age uninsured, the U.S. Public Health Service reports that the rate of decline in infant mortality nationwide has slowed, and that post-neonatal infant mortality has actually risen.[22]

What will the new vogue for competition do for them? Indeed, what is it likely to do for those who enroll in the new plans? Will they receive better care? What price is likely to be paid for the economies that are sought?

ENDNOTES

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Leighton E. Cluff

America's Romance with Medicine and Medical Science

MEDICINE IN AMERICA HAS BEEN progressing for at least a hundred years. Major achievements have generally been associated with significant social, economic, scientific, and technological developments. Before the nineteenth century, medicine seemed to be bogged down. There was little enthusiasm for experimental or quantitative study of biological phenomena. Medicine was characterized by fairly simple observations; there was ample room for conflicting interpretations and speculation. Physicians, as a class, were not held in very high esteem; at times, they did substantial harm in providing patient care. Medicine had not advanced very far from its roots in mysticism, ritual, and incantation. Development of the concept of disease specificity in the eighteenth century, however, provided the direction and the energy that carried medicine over the barrier of the mass confusion of earlier years, paving the way for a more precise differentiation and characterization of specific diseases.[1]

By the end of the nineteenth century, medical science made the search for the causes and cures of specific diseases its principal purpose. The discoveries of Pasteur, Koch and others in Europe opened up wholly new vistas for medicine, demonstrating, for the first time, the *practical* uses of medical science, and heralding its ability to diagnose and to prevent disease. Pasteur's revelation of the nature of the microbial world, and his demonstration that particular diseases could be prevented through inoculation of microbial agents into susceptible individuals made a powerful impres-

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sion. It won popular sympathy and support for medical science in a way that no other development had ever done.

Still, the extent of the potential benefits of medical research were recognized by only a very few at the end of the nineteenth or at the beginning of the twentieth century. It took Americans some time to realize that support of medical science might be crucial in efforts to alleviate or eliminate many human ills, substantially improving the social condition of many millions.

The yellow fever epidemic of the summer of 1878, which virtually paralyzed the social, cultural, and commercial life of the Mississippi Valley, provided the critical impetus for both government and private groups to support investigations whose purpose would be to study and control epidemic disease. These efforts, in time, led to the identification of the mosquito as the transmitting agent of yellow fever, resulting in the control and virtual elimination of the disease in the United States. Among its many twentieth-century consequences was the completion of the Panama Canal, which had major economic benefits for the nation. The application of medical discoveries and empirical insights similarly allowed epidemics of cholera, plague, and typhoid fever to be rapidly eliminated or controlled.[2] It all seemed almost miraculous.

Meanwhile, Semmelweis and Holmes, in the nineteenth century, had demonstrated that obstetrical infection could be prevented by the simple device of physicians washing their hands. Maternal deaths were dramatically reduced; hospitals became safe places for childbirth. Demonstration of the anesthetic effects of ether in 1842 had opened up surgical vistas previously thought to be impossible or exceedingly dangerous. The hospital came to be perceived less as a hazardous place suited only to those who were seriously ill and poor; it became a place to receive medical care not readily or safely available elsewhere. As the twentieth century progressed, the hospital also became a site for medical research and medical education; patient care was only one of its many functions.

Though the medical advances before the twentieth century seemed remarkable, they pale in significance compared with what has followed. The discovery of insulin in the 1920s made diabetes mellitus a controllable disease. Major discoveries in nutrition and the identification of vitamins after 1912 virtually eliminated scurvy, rickets, beri-beri, and pellagra. These were all seminal events, but the

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golden age of therapeutics began really with the discovery of penicillin and sulfonamides, industrially produced, whose effectiveness was fully demonstrated during World War II. The sulfonamides, introduced in the 1930s, were incontestably important, but penicillin had an even more profound effect, by safely controlling serious wound infections, syphilis and gonorrhea, meningitis, pneumonia, and other common and dangerous infections. These successes changed public attitudes enormously; they demonstrated the power of medical science, the importance of industrial research and development.[3]

Much of what has happened since, including the greater understanding of heredity and the working of genes, together with major developments in immunology, molecular biology, and drug therapy—and the application of this new learning toward improving the health of whole communities—has resulted from growing private and public support of medical research. The romance of Americans with medical science and the new expectations they held for medical care testify to an enthusiasm that knew no bounds. As Walsh McDermott wrote:

> If the era of medical science for the individual has set us so fast a pace—the pace is being stepped up still faster by the most recent trends in the medical sciences. Once again, as earlier in this century, the products of our medical science can be profitably used in certain mass efforts outside our walls. For, while these new tools from the physical sciences are permitting our researchers to delve ever more deeply into the tiny molecules that form our flesh, other medical scientists are studying man as a whole, and indeed are studying the medical problems of communities of people as a whole. And, certain of the emerging problems of our health today are affecting us not as individuals but as whole communities. I refer to such problems as the increasing pollution of our urban air, the appalling fatalities on our highways, or perhaps even the kind of fat with which we cook our food.[4]

The evidence of the successes of medical science to prevent and reverse the course of disease cannot be questioned. This is not to say, however, that all Americans, rich, poor, young, and old, have access today to the health care they require. Over the past several decades, elected officials have flirted with the possibility of introducing compulsory national health insurance; the United States is today the only major industrialized country to have a largely private medical insurance system. Not until twenty years ago, through Medicaid and Medicare, did the nation enact a public insurance program to assist

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the poor and the aged. Today, despite the continuing public support of medical science and medical technology, some thirty-five million Americans lack the insurance that gives them ready and easy access to the benefits of medical care.[5]

The unprecedented prolongation of life—the ability to save infants weighing 500 grams at birth, the power of medical technology to defer death—together with the daily mass media accounts of new breakthroughs in medical science and technology, have only fueled America's passion for medical research. Still, important new social, legal, ethical, and economic concerns have also arisen; they lead some to question what the overall benefits and long-term consequences of medical science and technology are likely to be. Medical care is provided in new ways; the organization of the medical system is changing; there is a seeming eclipse of samaritanism by new impersonal technologies, together with the appearance of what many perceive to be a growing avariciousness, with proprietary interests and profit motivations figuring in medical care as they never have before—all these developments challenge America's romance with medicine. These new attitudes could affect further advances in medical research adversely, having major repercussions also for medical care.

PRIVATE AND VOLUNTARY INITIATIVES IN MEDICAL SCIENCE

Empirical observations in the nineteenth century suggested that the food people ate, the water they drank, their cleanliness, their methods of disposing of human waste, and their shelter, clothing, and environment were associated with disease and health. Some who realized this gave emphasis to personal hygiene. Other reformers, including many physicians, stressed the importance of sewage disposal, of removing overcrowded urban tenements and unhealthy rural dwellings, and of providing clean water; they advocated establishing local boards of health to oversee public health. Public and church-supported hospitals were founded to care for the sick poor. These efforts improved health in general, and people expressed optimism that such improvements might be spread to all Americans. While the incidence of some diseases was decreasing, however, the incidence of others was increasing and creating concern. Not until certain social

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problems were corrected and fundamental new medical sciences were developed was there to be another major improvement in public and personal health.

The lack of understanding of diseases, the inadequate means to treat and prevent them, and the need for medical research were only properly recognized in the U.S. at the beginning of the twentieth century. Even then, most Americans seemed more immediately concerned with increasing wealth and personal comfort,[6] and less interested in the long-term commitment that was required to gain benefits from fundamental research. Such research advanced only when a few private philanthropists began to support medical science and its application by establishing institutes and foundations.

Elegant witness to the awakening of interest in medical science among a few wealthy philanthropists was the establishment, in 1901, of the Rockefeller Institute for Medical Research (now Rockefeller University) and its research hospital. Events leading up to the development of the Rockefeller Institute illustrate both how private philanthropy began to support medical research, and what the state of medicine was at the end of the nineteenth and the beginning of the twentieth centuries.

In 1897, Frederick Gates, a member of John D. Rockefeller's philanthropic staff, read William Osler's textbook, *The Principles and Practice of Medicine.* Gates was not a physician; he found no comfort in the fact that, with few exceptions, medicine did not provide cures; about all that it could offer was some measure of relief; some advice on how to nurse the sick, and how to alleviate, in some degree, their suffering. Gates realized that a large number of the most common diseases, especially those of the young and middle-aged, were infections. Yet few causes of these infections had been identified and isolated. When he laid down this book, he "had begun to realize how woefully neglected in all civilized countries, and perhaps most of all in this country, had been the scientific study of medicine. Here was an opportunity for Mr. Rockefeller to become a pioneer."[7] These considerations convinced Rockefeller and his son to establish the Institute of Medical Research in 1901.

There was, however, little *public* enthusiasm for medical research early in the twentieth century. The Rockefeller Institute and other similiar research institutes had been founded; Mendel's law had been rediscovered after having been negated for years; Virchow and

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Ehrlich had breached the distance between morbid pathology and immunology; the Carnegie Foundation was calling attention to the need to control disease; sanatoria for tuberculosis were springing up; and Phipps had focused attention upon an antituberculosis crusade. But, on the whole, people were indifferent to the possibilities that had so inspired Gates. Elected representatives at the state and federal level remained "utterly deaf"—some opposed vaccination when a smallpox epidemic confronted them; others suppressed evidence of plague and the extent of the widespread hookworm infestation in the South. Faced with such legislative indifference, the need for private initiatives, such as those grasped by the Rockefeller Institute and the Rockefeller Foundation, was all the more urgent.

In the late nineteenth and early twentieth century, leading physicians went abroad to study with medical scientists in Europe and Great Britain. Some felt that medicine's great hope lay in experimental approaches to clinical problems. The original charter of the Rockefeller Institute reflected their view when it stated that its purpose was to conduct and encourage research; to train young physicians in the nature and causes of disease, the method of its prevention and treatment; and to make research findings available to protect the health of the public.

Between 1901 and the 1950s, the support of medical research in the U.S. was largely provided by private philanthropy. In fact, medicine and public health were the greatest beneficiaries of philanthropy; without its support, the development of medicine might have been quite different. Philanthropic encouragement was indeed essential to the advance of medical science in the U.S., even though federal support of research became more and more substantial during and after World War II.

The Rockefeller Foundation had the longest and the broadest impact on American medicine; its pioneer effort to eradicate hookworm infestation in the South was extended to other epidemics, including malaria, schistosomiasis, typhus, tuberculosis, influenza, and yellow fever. Other private philanthropic organizations also made funds available and demonstrated what advances were possible, given support for the application of medical research. Carnegie and Pritchett, the Milbank Memorial Fund, Commonwealth Fund, John and Mary R. Markle Foundation, W.K. Kellogg Foundation, Josiah Macy, Jr. Foundation, Ford Foundation, and, more recently,

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The Robert Wood Johnson, Howard Hughes, Henry J. Kaiser, Hartford, and McArthur Foundations have made substantial contributions to medical science and medical care services. Today, however, private funding of medical research and innovations in medical care is modest in comparison with federal and state or public expenditures.[8] Indeed, between 1950 and 1976, the percentage of all support for biomedical research provided by private funding decreased more than five-fold, and has come to represent less than 5 percent of the total.

Voluntary health organizations, as opposed to private philanthropy, reflect a growth of public interest in and commitment to supporting medical research and advances in medical care.[9] The first such voluntary effort in America began in 1904 when the Association for the Study and Prevention of Tuberculosis was founded. Yet the leading example of public awareness of the need for research in disease control and for special care of those afflicted was the work of the National Foundation for Infantile Paralysis. This voluntary effort, established in 1938 with a "March of Dimes," solicited broad public support for the study and prevention of poliomyelitis. Its successful development and testing of a vaccine between 1952 and 1954 captured public attention and removed the annual fear of a polio epidemic and its aftermath. This major breakthrough increased the enthusiastic support of all Americans for medicine and its potential contributions to people's lives. There are now numerous voluntary health organizations, most of which support and serve as advocates for medical research, training, and services, with the expectation that physicians will further understand and control specific diseases.

PUBLIC INITIATIVES IN MEDICAL SCIENCE

Public support of medical research has often developed as a by-product of attempts to solve practical problems. Authorization for the fundamental research needed to solve problems of specific diseases has been given by Congressional acts since 1912. Until 1944, research in the U.S. Public Health Service was, for example, supported by appropriations aimed primarily at combatting specific threats such as yellow fever, cholera, leprosy, venereal diseases, and cancer. Yet, global warfare of the 1940s did more to increase public interest and federal support of both theoretical and applied medical

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research than had the extensive epidemics of the past. Since the end of World War II, the federal government has become a major force in determining the magnitude and direction of biomedical research, now committing in excess of five billion dollars annually to support of such research.[10]

During World War II, the impact of antimicrobial drugs, vaccines (such as tetanus toxoid), plasma and blood transfusions, and other new preventive and therapeutic interventions upon mortality from wound infections and epidemics was dramatic; surgical treatment of war-inflicted injuries reached new standards; the control of malaria dispelled widespread fear; these and other medical achievements generated rising public enchantment with what medicine could achieve, and what its future promised. The groundwork provided by private philanthropy and voluntary organizations from 1901 to the mid-forties supported the development of research institutes, the training of medical scientists, and encouraged medical research in university laboratories; it was an essential background to the federal support that began to grow during World War II and the 1950s.

The Army ASTP, Navy V-12, and GI bill programs, enacted during and after World War II, enabled many young people to go to medical school and to train to be practicing physicians, medical scientists, and medical educators. This, undoubtedly, gave impetus to the subsequent rise and development of American medicine. Without these programs, a career in medicine would, for many, simply not have been possible. However, the bills introduced to medicine young people who became aware of its possible grandeur and potential contribution to human welfare. As these physicians trained and participated, they realized how the new science and technology could help to defer death and preserve life. This added considerably to the growing public awareness that medicine and medical science provided an exciting endeavor. The financial, professional, and personal rewards for physicians who had high levels of technological and scientific skill had a further impact on the development of medical care for Americans, and helped increase enthusiastic support for specialized physicians.

An early contribution of the federal government was the creation of a National Board of Health in 1879 to coordinate the control of epidemic diseases.[11] The life of the Board was short and its functions

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limited; its activities were transferred to the Marine Hospital Service in 1893. There, a bacteriological research laboratory, located in Washington, DC, became known as the Hygiene Laboratory. In 1912, legislation was enacted to create the U.S. Public Health Service (USPHS) out of the Marine Hospital Service. Based upon the scientific advances that were developing under the auspices of private and volunteer efforts, the USPHS was charged to study and investigate diseases damaging the nation's health. This allowed the support of classic studies in pellagra and eventually, with the help of private efforts, the USPHS demonstrated that this disease was the result of dietary deficiency. The role that government, together with public interest, could play in medical research was beginning to emerge.

Amidst the American prosperity and enthusiasm after World War I, Senator Joseph E. Ransdell introduced a bill that, in 1930, changed the name of the Hygiene Laboratory to the National Institute of Health (NIH), and provided the USPHS with authority to support the training of young men and women for careers in medical research.[12] The model of the Rockefeller Institute was influential in this effort. In the nineteenth century, Tocqueville had predicted that fundamental science would flourish and advance in the United States only if the "constituted authorities" deliberately encouraged individuals who were scientifically inclined.[13] The enactment of this bill to establish the NIH and encourage the training of young people in science fulfilled Tocqueville's prediction. Indeed, the Congressional action stimulated events that eventually placed the U.S. first among nations in fundamental medical science.

The mood of the nation's elected representatives, surely supported by their constituencies, was reflected during the 1930s in a report of a Congressional committee:

> Scientific research is the most important function of the Federal Government as relates to public health and protection. While steady progress has been made along these lines, the problems presented are becoming increasingly complex. There is a necessity, therefore, that larger facilities should be provided, that means can be adopted whereby the services of training scientists can be utilized, and cooperation on the part of the Government with scientific institutions wherever located be encouraged.[14]

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In 1937, seven years after Senator Ransdell's bill was enacted creating the NIH, Senator Matthew M. Neely inspired support for the statuary creation of the National Cancer Institute.

The nation was fully prepared, then, to invest resources in medical research during World War II, involving both scientists who held government positions and those who did not; their achievements helped protect and save the lives of military personnel and civilians during the war. Indeed, the whole scientific community was impelled to attack the problems created or accentuated by the war. In addition, a national Committee on Medical Research of the Office of Scientific Research and Development (OSRD) was established to identify the major war-related medical problems that demanded urgent attention. Contracts were made and funds provided to universities, medical schools, research hospitals, and research institutes to address these problems. An unprecedented degree of collaboration developed between academic scientists, industrial research and development (R&D), and civilian government—forged as part of an unusual national unity.[15] This collaboration, at a time when scientific and medical achievements were emerging rapidly from research, radically transformed American medicine.

In 1946, after the war, the OSRD progressively phased out its incomplete wartime contracts. Up to that time, the NIH supported the research largely of its own scientists, but government scientists had developed close collaboration with scientists in academic centers and research institutes. The NIH, therefore, departed from its tradition, and assumed responsibility for supporting the work of scientists outside the NIH. It also sought Congressional support for projects relevant to peacetime medicine, as well as extramural grants for research and training that would combat civilian problems. From that time on, the NIH has been by far the predominant national institution that supports biomedical research.

Using the National Cancer Institute as a precedent, interested scientists and citizens persuaded Congress to establish, in 1948, a National Heart Institute. Since then, the organizing principle of the NIH has been to establish institutes around categories of disease.

Other federal agencies conduct, and, to a lesser extent, support both government and external research programs. The Center for Disease Control (CDC), established in 1970, but formerly known as the Communicable Disease Center (1946–70), has major responsi-

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bilities for epidemiology, monitoring the public health, and conducting field studies of disease problems. Medical research has also been furthered recently, especially during the last twenty years, by regulatory agencies such as the Food and Drug Administration. In addition, scientific and technological achievements in government-supported research on military defense and aerospace have contributed expertise, which has helped advance medical technology and medical care. Such a commitment to research has proved essential to confronting the nation's health problems. Private and voluntary institutions and foundations now play a small part in the overall funding of biomedical research, although in highly targeted areas their support may be more nearly exclusive. Unfortunately, some feel, the increasingly dominant role assumed by the federal government in regulating medical technology has created an adverse relationship that impedes the type of collaboration so fruitful during World War II.

The enormous growth of Congressional appropriations and expenditures for medical research after World War II occurred during a period of rapid economic growth. During these prosperous times, not even the costly Korean and Vietnam conflicts apparently reduced the rate of increase in public support for medical research. Yet such growth could not be sustained without putting great pressure on both the government's and the nation's resources.

As concern about government expenditures and economic decline has grown in the past decade, federal support for medical research has not escaped scrutiny. For more than thirty years following World War II, public and elected officials' enthusiasm for the promises of medical research, combined with the nation's thriving economy, had encouraged America's romance with medical science. However, as economic conditions deteriorated, public support of medical research weakened.

INITIATIVES FOR MEDICAL CARE AND HEALTH

As medicine became more scientific, and as a result more effective, the public came to expect more of it; demand for medical care increased. The progress of medical research and the development of powerful new technology altered the training and practice of health professionals. Medical care became increasingly institutionalized and dependent upon specialized health professionals and health-care institu-

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tions. It became correspondingly more costly, especially in the hospital, and failed to accommodate many who were poor or isolated; for them, access to medical services diminished.[16]

As medical care became more specialized, the proportion of general physicians fell. This often put patients in the position of having to determine for themselves the specialist most appropriate to their particular complaint. If they had more than one medical problem, patients were forced to receive care from more than one specialized physician. They subsequently received bills from several practitioners, each of whom had performed diagnostic or therapeutic procedures for which there were additional charges. This proved not only expensive, but also confusing and frustrating. The power of medical technology to diagnose and intervene compounded this problem by apparently diminishing the samaritan or human caring function of physicians.[17] At the same time, the technological ability to maintain life, irrespective of its quality, began to create further legal, economic, and ethical problems for which acceptable solutions have yet to be found.

In 1900, patients were confronted with physicians who often had little, if any, formal training. Many had served as apprentices to practitioners and had read anatomy and empirical textbooks. Some had attended proprietary or educationally deficient schools. College or university education was often not required of them. In order to protect the public from incompetent doctors, states introduced legislation requiring physicians to pass a medical examination before being licensed to practice; graduation from a medical school was insufficient evidence of their competence.

The emergence of biomedical science in the nineteenth and early twentieth centuries, along with concern about the training physicians received, stimulated the Carnegie Foundation to support a study of medical education in the United States.[18] This study, widely known as the Flexner Report, was published in 1910, and inspired dramatic changes in the way physicians were prepared for practice. Medical education became the responsibility of universities or colleges; undergraduate education was a prerequisite; increasing emphasis was laid upon the biological and physical sciences that were by then the basis of medical competence. Medical schools developed formal curricula, which included education in the fundamental medical

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sciences (anatomy, physiology, biochemistry, pharmacology, and microbiology), as well as the experience of caring for patients in hospitals and clinics. Faculty members were increasingly employed full-time by the medical schools in order to meet their greater responsibilities for teaching, research, and patient care.

Private philanthropy and state governments gave support to strengthen the academic and university structure of those medical schools that survived. The schools, in turn, developed procedures to accept only the best qualified student applicants.

As the science and technology of medicine rapidly developed, patients and members of the profession came to expect medical schools and their teaching hospitals to be on the leading edge, preparing physicians for the future, and providing the most up-to-date practitioners and care. After World War II, academic medical centers gradually became the foci of the public's enthusiasm for advances in medicine and medical care.

The need for training beyond medical school was inevitable if physicians were to be equipped with the necessary experience and skill to apply developments in science and technology as was expected of them by patients. Graduate medical education, which included hospital-based residency or house-staff training and post-doctoral fellowships, was essential; it could take only one year of "rotating internship" to prepare general practitioners, or several years of training to qualify in one of a growing number of medical specialties.

Physicians tended to confine themselves more to narrow fields of specialty, especially after World War II, and people wanted access to these highly skilled specialists. General practitioners were, by comparison, less esteemed, and the proportion of general physicians declined. Specialized technology was often available only in large urban hospitals, and the decision of many young physicians to practice in these settings led to a maldistribution of physicians across the nation; fewer physicians were available who were willing or able to provide general medical care; in rural areas the supply was particularly inadequate.

Several reports issued by the government and private groups in the fifties and sixties suggested that the growing population's need for medical care was outstripping the supply of physicians. The government provided incentives for medical schools to increase their enroll-

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ment and to liberalize the opportunities for foreign medical graduates to train and practice in the United States. Less than twenty years later the government-sponsored GMENAC Report[19] suggested that by 1990 the nation would face an oversupply of physicians. In response, efforts are now being made to decrease the number of medical students and foreign medical graduates in the U.S.

During the past thirty years, a vast array of new health professionals have been trained to use and provide new technology and procedures. No longer can a single physician use all the medical technology available; he may be the "captain of the team," but he depends upon the expertise of many others. The romance Americans had with medicine, epitomized by the physician, transferred to new settings and different health professionals. The doctor's role had changed.

In addition, the proportion of women among health professional students grew, especially in medical schools. Their impact on medicine has yet to be seen, but they will undoubtedly change it. Some contend that, if women had not found medicine an attractive career, men alone would probably not have kept the physician manpower at the level required to meet the nation's need or expectations.

The mushrooming of medical technology, the growing numbers of health professionals and physician specialists, and the increased complexity of medical care made Americans look for the simplicity of the past. They dreamed of the kindly family doctor who would always be available to provide comfort, and manage their care. Indeed, they felt divided; though they wanted highly skilled specialists, they romanticized the general practitioner.

In response to this apparent demand for general physicians to treat common medical problems and to provide continuing care outside the hospital, government and philanthropy provided incentives in the 1970s for medical schools and hospitals to increase the proportion of general physicians. Programs were financed to train family practitioners, general internists, general pediatricians, and other generalist physicians; funds were provided to train nurses in what became known as primary care; building on experiences with "medical corpsmen" during World War II, physician assistants were trained so that primary care could be extended to even more people.

With a predicted surplus of physicians, the future of primary care nurses and physician assistants is now uncertain. In addition, efforts

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to control excessive government expenditures and the mounting federal deficit may have the effect of reducing support for programs that train generalist physicians.

Medical education and training have unquestionably adapted to advances in science and technology, to people's expectations and social needs, and to political pressure and incentives. In the process, they have reaped economic and professional rewards. But these developments have altered the way medical care is provided, influenced people's expectations of treatment, and significantly changed its organization and financing.

Before World War I, most physicians practiced alone.[20] There was little that these physicians, most of whom were general practitioners, could not do, assisted by a nurse and with a general hospital available for surgical procedures and supportive care. During World War I, however, the experience of physicians in the medical corps impressed upon many young doctors the value of practicing in groups. The model for private group practice was the organization established by the Mayo brothers in Rochester, Minnesota. After a faltering beginning, many large multi-specialty groups and clinics, as well as smaller single or multi-specialty groups, have been formed. These organizations have provided economic and professional advantages for physicians; in some instances they have opened investment and tax-saving opportunities, and increased access to the capital that is required for expanding technologically based office or clinic practices. Some patients have found that group practices, especially those composed of a full array of health professionals and medical specialists, provide a substitute for a single general physician. In other instances, patients were shuttled from one specialist to another, particularly when they had several different clinical problems; this was avoided only when the group practice or clinic identified one physician as the manager, or orchestrator of patient care.

During the early development of physicians' groups, corporate capitalism was kept out of medicine partly because the public and government espoused the ideal of a free profession.

After World War II, direct service prepayment plans, in contrast to fee-for-service reimbursement, gained acceptance as a new way to organize and finance medical care. The Group Health Corporation of Puget Sound, financed by the sale of bonds to its members, began to

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grow; three decades later it provided medical services to about one-fifth of the population of Seattle. Another postwar organization developed out of the medical services Henry J. Kaiser had arranged for his employees, and it grew into the largest prepaid health program in the nation, with its own clinics, hospitals, and physicians. By 1947, the Health Insurance Plan of New York (HIP) provided health services to subscribers under contract with Blue Cross for hospital care; city employees were responsible for half the premium and the city paid the other half. Within ten years, over 500,000 people were enrolled in HIP.

In the mid-forties, some private physicians countered the movement towards large organizations that had their own clinics, hospitals, and doctors by developing prepaid benefits like those offered by Kaiser and Puget Sound, allowing patients to retain their private physicians. The participating doctors accepted reduced fees if the prepaid revenues were inadequate, and policed their membership to prevent abuse. These organizations were the forerunners of "Health Maintenance Organizations," or HMO's, and "Independent Practice Associations," or IPA's. After uncertain starts, these new systems for medical care—large group fee-for-service practices, HMO's, and IPA's—are providing a way of controlling unnecessary medical care expenditures and of assuring access to health services, and a high quality of care. Many Americans are enrolling in such programs in order to obtain both the general and specialized medical services they desire. Many others continue to prefer the freedom to choose their own physician and place of care.

As the excitement generated by medical science and technology grew, so too did hospitals' need for aid; people expected their hospitals to provide the very latest medical technology. In response to America's romance with medicine, the federal government provided the necessary resources for construction programs, such as the Hill-Burton Program, to improve both Veterans Administration and community hospitals throughout the nation. Advocates of the Hill-Burton Program believed it would provide access to powerful new medicine for families and communities that otherwise could not obtain it. The funds were, however, disproportionately allocated to middle-income communities; because communities were initially required to raise two-thirds of the construction funds, and the

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hospitals had to show that they were financially viable. Hospital construction was largely financed, then as it is now, by payments for patient services, adding to the growing cost of hospital care.

The method of reimbursing hospitals, largely through private and public insurance, for the costs they incurred in providing services had no limits and was financially rewarding for hospitals. The great resources that became available to community hospitals stimulated each to compete with the other for the latest in technology, as a means to attract physicians and patients. Physicians were the consumers of hospital services, solely responsible for the hospitalization of patients; doctors dominated hospitals; the competition between hospitals for doctors and their patients resulted in the wide-spread duplication and expansion of services and medical technology within many communities. The imposition of federal and state planning and regulatory agencies had little impact on hospitals, until stringent, tightly controlled mechanisms were instituted for paying hospitals for services they performed.

The profitability of hospital care led to a rapid increase in proprietary or for-profit hospitals and hospital chains. Yet, in many ways, not-for-profit, voluntary community hospitals began to resemble proprietary or for-profit hospitals and hospital chains as they sought to compete with one another; their characterization as "charitable" institutions, worthy of tax-exempt status and state or community bonding authority, is open to question.

Those born before the 1940s recognize that the cost of medical care was then a personal or family responsibility, except for the very poor and aged who received charitable care in community or public-municipal hospitals. Privately supported health plans, however, began to grow, and by mid-century, as the curative power of medicine increased, the economy thrived, and people's romance with medicine flourished, health insurance became more necessary and readily available.

Before the 1930s, private health insurance was not encouraged because of concern that it might create excessive demands for medical services and unacceptable medical expenditures. In the 1920s, disability insurance for employee groups had become more common, but the growth in health insurance did not really begin until 1928 when General Motors signed a contract to cover 180,000 employees.

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Programs such as this were more concerned with income protection than payment of medical expenses. Indeed, medicine had little to offer, and income protection was more important to employees than was medical care.

When the Depression struck in 1929, the rising cost of hospitalization was beginning to threaten middle-class families. To deal with this problem, 1,500 school teachers in Dallas, Texas, negotiated an agreement with Baylor University Hospital to provide up to twenty-one days hospital care at a cost to each teacher of $6 a year. This arrangement was expanded to other groups, and additional hospitals developed similar plans. It was the beginning of Blue Cross.

The financial insecurity of many of the nation's voluntary hospitals during the Depression encouraged them to turn to insurance schemes that would cover a patient's charges for hospitalization. Hospitals provided the underwriting for this insurance—the basis for voluntary hospitals' long-term control of Blue Cross.

Yet the medical profession resisted the development of insurance programs to pay for hospital services because of concern that this could result in hospitals engaging in medical practice. To avoid this, insurance for hospital services was arranged separately from insurance for physicians' services; in the 1940s, Blue Shield was established as a mechanism, controlled by the medical profession, that would insure payment for physicians' services.

After World War II, commercial insurance companies progressively took more than half the market away from Blue Cross for coverage of hospital costs. This development was related to the growth of a private social security system and to the efforts of employers and unions to provide employee health benefits. Unions began to recognize that, if expectations and needs for modern, expensive medicine were to be met, health benefits for employees were essential.

In the decade after World War II, Americans grew increasingly wealthy, and a larger proportion of them, who recognized the new power of medical science and technology, sought some type of hospital insurance. Insurance that covered hospital and physician services both benefited doctors and hospitals and improved people's access to more effective medical care.

Most medical insurance programs provided payment on the basis of fee-for-service and cost or charge reimbursement. Those who paid

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for the insurance, and insurers themselves, had almost no control over the cost of services provided by physicians and hospitals. Direct-service prepayment plans, however, became more firmly established after World War II, largely in response to the demands of employers and unions. The growth of such prepaid systems, including HMO's and IPA's, has accelerated recently, more because of their apparent control of unacceptable increases in health-care costs, than because they improve access to medical care and medical technology.

The number of people covered by commercial health insurance grew rapidly after World War II, but the unemployed, the poor, and the aged who were economically disadvantaged were left uninsured. In order to remain competitive with commercial insurance, Blue Cross and Blue Shield avoided the burden of insuring the poor and the aged. Responsibility for these groups fell to the government. Instead of creating an insurance system that would relieve economic problems and improve access to powerful new medicine for working Americans, the nation had developed a system that improved the access of middle-class people to hospitals, and of hospitals to middle- and upper-class patients. This insurance system had evolved under the control of hospitals and doctors and brought them professional and economic benefits; but it left to the state the responsibility of satisfying the need of less fortunate Americans for medical care. For many people, their romantic notion of medical development was not fulfilled, and this was especially true of those who had the greatest burden of illness—the poor and the old. However, in spite of the inequities in their distribution, the very existence of private health insurance and prepaid programs for industrial employees depressed any popular agitation for national health insurance.

INEQUITIES AND MEDICINE'S NEW PROBLEMS

In the early 1960s, Americans, and especially young people, wanted change; restive with the war in Vietnam, they advocated Civil Rights and were intolerant of the continuing inequities of American life, including uneven access to medical care. Americans' postwar celebration of their nation's achievements was losing vigor. Yet, recurrent recessions, unemployment, and slow economic growth brought with them a new set of federal initiatives to assure that inequities in access to medical services were eliminated.

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Americans came to see in medicine and medical science a way of remedying personal and social problems. Child abuse, alcoholism, drug abuse and its consequences, affective or behavioral disorders, suicide, even homicide, were added to medicine's agenda. "Transmedical problems" became a bigger part of its responsibility.[21] Science and medicine seemed to offer the prospect of further improvements in general well-being. Yet Americans continued to worry about their health; and their main concerns were associated with getting old, with persistent disability or chronic illness.

Advances in the drug treatment of chronic and acute mental illness allowed many institutionalized patients to return to the community. Community mental health centers were established with federal funds to support community care. Not long thereafter, neighborhood health centers were also set up to provide medically underserved communities with primary care. Further government efforts were needed to see that the benefits of modern medicine were not only a privilege for the well-off, but a "human right."

In 1965, the federal Medicare program was enacted to finance hospital care (in Part A) and physicians' fees (in Part B) for older citizens. A second program, Medicaid, was introduced, which gave the federal and state governments shared responsibility for financing the care of the poor.

The health programs of the 1950s and 1960s, supported by federal and state governments, added to the private health insurance programs for working Americans, and provided a financing mechanism for most to assure that their enchantment with medicine and medical science could be satisfied.

Health care gradually became a larger part of America's economy; it was a benefit Americans had come to believe was their right, and this led quite naturally to rapid changes in what they wanted, in what medicine could provide, in how medical care was organized; at the same time, confidence that medicine, medical science, and medical technology was all it had claimed or was thought to be decreased. Many Americans began to recognize that maintaining their health, reducing their dependency on medicine, and avoiding costly illness and disability might be achieved by controlling what they ate, how they exercised, what they smoked and drank, and by reducing the stress of everyday life.

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Nevertheless, too many Americans, either because they are unemployed, not poor enough, or do not meet other eligibility requirements, find that financial assistance is not available to them, that they do not have access to the medicine and medical technology they want, and from which they could benefit.

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The life expectancy and health of Americans today exceeds what anyone could have anticipated over fifty years ago. Walsh McDermott entered medicine before the potential of its science and technology had been fully appreciated. He saw medical science develop during his professional career. Infant mortality dropped to levels thought improbable not many years before; the survival of infants weighing 750 grams or less would not have been deemed possible ten years ago. Death during childhood or young adulthood from diphtheria, measles, rubella, whooping cough, diarrheal or respiratory diseases is no longer common. Disability from acquired diseases such as polio is not a threat. Smallpox has been eliminated (although Walsh McDermott was not sure it had been *eliminated* forever), and Americans no longer require vaccination. People who would earlier have died from heart attacks now survive. Rheumatic heart disease is disappearing. Today, even aerospace technology is contributing to the relief of some disabling problems. The biological sciences are providing insights and new technology for the physical sciences.

Despite these advances, Americans still get sick, need medical care, and even feel that medicine may be responsible when they do not remain well. America has championed medicine and medical science, and its citizens have provided the resources for medicine to flourish and achieve world distinction. In response, medicine has provided more services, and more technology that can preserve life and prevent disease. It is highly probable that we have witnessed only the beginning of its rise.

At the same time, runaway costs for medical care are depleting resources. America's romance with medicine, however, persists, though in a faded form. It seems very unlikely that we shall ever agree to deprive ourselves, individually or as a society, of the benefits that advances in medicine and medical science bring. But social, legal,

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ethical, and medical problems must be discussed in order to *rationalize* (not ration) the use of medicine and medical technology. Only when medicine can better predict the benefits or risks of interventions for chronic or critical illness at the beginning and end of life, and only when medicine and society together can agree upon ethically appropriate medical care, will it be possible to control health-care costs, to avoid inequities in access to medical care, to revive or continue America's enthusiasm and support for medicine and medical science, and to establish the appropriate function of medicine that is restoring, preserving, and assuring people's good health.

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Kenneth G. Johnson

Reaching Out To the Community: Responses by Medicine

OUTREACH IS AN AWKWARD NEOLOGISM, coming out of the lexicon of the 1960s War on Poverty. Many of the outreach programs of the 1960s were linked to community programs, directed by medical schools or academic health centers. The greatest number accomplished little and had very short lives. To limit one's understanding of the potentialities of outreach to these 1960s efforts, however, would be grossly unfair; it would be like judging all industry only by its more conspicuous failures. Outreach, properly understood, involves the deliberate extension of a tangible benefit to a larger public, beyond the constituency that is normally served. In this sense, medicine has been practicing outreach for centuries. Individual physicians have often acted, in liaison with the public, to achieve certain beneficial ends.

A useful perspective on outreach—what it was, why it failed at times, how it has changed—calls for a few brief references to history. The twentieth century offers certain striking examples: during the early part of the century, the broad application of biomedical knowledge *prevented* the spread of many important and devastating diseases; by the middle of the century these and other diseases were largely *cured* by the advent of antimicrobial agents; today, when the general state of the nation's health is high, outreach needs to be targeted mainly at disadvantaged groups in the society, and less towards the population as a whole.

Walsh McDermott's contributions to outreach corresponded closely and sequentially to what medicine had to offer in his period.

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In helping to develop the definitive treatment of syphilis, typhoid fever, bacterial pneumonias, and tuberculosis, all major contributors to the nation's morbidity and mortality, he introduced powerful scientific interventions. Later in his career, he directed his attention to physicians and the systems they work in; his purpose was to improve and protect the health of the vulnerable in U.S. society—infants, children, and the elderly. For many of his colleagues, Walsh McDermott provided the rationale, direction, and standards for outreach programs.

McDermott's influence on outreach by medical school faculty and students was pervasive. Under his chairmanship, the Department of Public Health at Cornell suffered little from the allegations of non-relevance so common in the 1960s. As an established clinician and researcher of international distinction, he chose to address the health problems of the public. McDermott considered a firm base in medicine a primary requisite for physicians engaged in outreach, for they had to understand the medical care system in order to improve it. They could then bring their medical knowledge and discipline to outreach and promote a *bio*social achievement. The medical center and its biomedical complex should, he felt, seek programs that can be expected to make a long-range contribution to both current and emerging problems of our society.

The two principal requirements for medical outreach are biomedical knowledge that can be transformed into a useful intervention, *and* the organization of a community network to form a social intervention that will make this knowledge available to the public. Extending a benefit beyond a limited constituency, to the public, calls for this additional process, for the mere existence of useful technology gives no assurance that it will reach the afflicted.

Medical outreach is an expression of public-spiritedness that is fundamental to the general perception of medicine as a profession, and is rooted in medical traditions. The successful completion of a bridge to the public may be thwarted by economic, political, and cultural factors, but the physician's responsibility to persist in protecting the health of the public remains. Few physicians have assumed this responsibility for outreach. For the majority, caring for known patients and maintaining technical competence have the highest priority. Medical training offers them little preparation for anything but the diagnosis and care of individual patients; as apprentices they

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were prepared for the private practice of medicine. Medical schools completely lost interest in the public's health when the special field of public health was established; Hermann Biggs recommended, in 1897, the creation in New York of a school of preventive medicine to train physicians to serve as municipal and county health officers;[1] a study by Abraham Flexner, supported by the Rockefeller Foundation, led to the establishment in 1916 of the Johns Hopkins University's School of Hygiene and Public Health with William B. Welch as director.[2]

Unlike other medical specialties, public health developed separately from the mainstream of medical education and clinical training. Public health physicians dealt with prevention and public and personal hygiene, under the auspices of government health authority. They became a separate caste and often medical outcasts, almost entirely removed from the practice of diagnostic and curative medicine. By providing a convenient ledge on which responsibility for the public's health could be provided, the schools of public health relieved the medical schools of responsibility for training physicians to be attentive to public health. Fortunately, however, there have always been some physicians within the medical and public health establishments for whom the process of providing knowledge and technology to the public has remained a priority. They recognize the need to inform the public and act as a catalyst for whatever mechanism can deliver the benefits. Such physicians' concern for excessive morbidity and mortality in groups within the population was called by Walsh McDermott, "statistical compassion"—compassion for the people behind the numbers.

Success of outreach is determined by several factors; much depends on the value, efficacy, and safety of the biomedical intervention itself, and the ability to reach the persons who can benefit from it. An equally important factor is the expected number of people who would be helped—a cost-benefit estimate. Consideration of cost may, however, be overridden by the possibility of a great threat to larger numbers. In addition, the receptiveness and support of the public relate to the social class of the afflicted; special advocacy is required to develop programs aimed specifically at minority groups.

The first half of the century brought numerous demonstrations of the benefits of new knowledge when applied to the physical environment, especially in the control of water- and milkborne diseases. Such

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measures, combined with the personal protection provided by immunization and proper diet (that could prevent rickets, pellagra, and scurvy), did more to lower general mortality and morbidity than the intervention of later periods. Consider the impact made by Park and Zingher in 1915 when they reached out to protect thousands of New York City school children, shown by the Schick skin test to be susceptible to diphtheria, with diphtheria toxin-antitoxin.[3] Mortality from diphtheria promptly dropped from 300 deaths per 100,000 in 1915, to 100 in every 100,000 by 1920. This was the first application of the new knowledge of microbiology and immunology to the general public. The intervention was powerful, the time lag of six years between its discovery and application relatively brief; the public was highly receptive and gave substantial support. Yet, the early period was not free of the political and social factors that thwart outreach. Blindness among children who suffered gonococcal *ophthalmia neonatorum* was left untreated despite Crede's demonstration, in 1884, that the infection could be prevented by instilling a few drops of 2 percent silver nitrate solution in the newborn's eyes. It was not until 1936 that forty-six states mandated the procedure.[4] Failure to broadcast its benefits immediately must be ascribed to society's judgment of those afflicted with venereal disease and of their offspring; indeed, there were physicians at the time who avoided treating patients with venereal disease lest they be known as "clap doctors."

In addition to establishing the efficacy of primary prevention of many diseases, the early part of this century also reveals that much good could be done without powerful scientific intervention. Settlement houses, food kitchens, and housing projects were set up; public health nurses made home visits; and the importance of personal hygiene and fresh air was emphasized.[5] Nutrition, housing, personal behavior, and income were then appreciated as being directly related to health—a relationship that has recently been rediscovered.

The last widely celebrated outreach effort of the entire century may well have been the national testing, in 1955, of a killed vaccine developed by Jonas Salk to prevent poliomyelitis. Poliomyelitis had no respect for social class, and it struck terror in communities. Each day of the vaccine trial, city newspapers reported the number of children who took part. The subsequent announcement of the substantial protection of children who had been treated with the Salk

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vaccine received great public recognition. Reaction to the subsequent development of a live vaccine (Sabin) in 1961, and later measles vaccines (rubeola and rubella) was, in comparison, anticlimactic. This change can be understood in the light of the high level of optimism for the nation's health that the spectacular advances in medicine following World War II had engendered.

In the 1950s, the availability of the new antimicrobial agents (penicillin, chloramphenicol, streptomycin, isoniazid, and the like) provided cures for patients with infectious disease. What could still not be cured was, at least, better understood. The diffusion of these advances to personal physicians was remarkably rapid. With such great scourges as tuberculosis and syphilis controlled, the agenda for outreach appeared for the moment depleted. It was up to the public health system to follow through on the medical advances.

The substantial benefits that the new medicine offered depended upon the attention of a personal physician, and therefore did not always reach the urban and the rural poor. The interventions were not vaccines that could be administered with dispatch by public health teams; their delivery was the work of private physicians. As a result, people with disease that was by then treatable, but without access to decent medical care, remained untreated.

Access to medical care was particularly poor in the ghetto. By 1960, dilapidated housing, poor schools, inadequate police protection, absence of public transportation, high food prices, and undependable sanitation services had become standard features of life in the ghetto. Few private physicians chose to work there, and local hospitals failed to attract ambitious U.S.-trained physicians. A crowded, poorly staffed emergency room was the substitute for the family physician. Although partial care could be obtained at the public health station, it could not be considered primary medical care. The public health statistics resembled those of a developing country.

Within the din of rioting and rebellion in the sixties, the long-standing inequities in medical care were easily perceived. With the election of John F. Kennedy and the succession of Lyndon B. Johnson, a national constituency developed that would no longer tolerate the severe medical afflictions of poverty. Improving the poor's access to care became a major initiative of the War on Poverty, and the aim to reform the health-care system gained urgency.

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Federal support for improving health care for the poor in this period was generous. Medicaid (Title 19), passed with the Medicare Act in 1965, gave permanent enfranchisement to the very poor for medical care. There was additional federal support for the establishment of neighborhood-based centers for ambulatory care, including mental health care, and for special projects that established or enlarged departments of community medicine, and provided fellowships to train residents in the community for health-related occupations. Generous federal support in the forms of economic assistance for housing, jobs, and community organizations was also given, and the local community was encouraged to participate in the management of these projects.

Medical schools and their medical centers were the obvious resources that could be exploited to improve care for the underprivileged. However, apart from their student bodies, the medical schools were reluctant to participate in the social movement. They were soon placed on the defensive and became the target of sharp public criticism—regarded as one of the several "establishments" that had failed society. Neglect of the poor was frequently ascribed to the insensitivity and self-interestedness of the "medical establishment." No past credits for research, education, and training sufficed to offset the virtual absence of physicians in ghetto neighborhoods.

Although over 85 percent of the nation's physicians were private practitioners—and, unlike the medical centers, fully able to provide primary medical care—they were spared all but the usual invective addressed to the American Medical Association. Nor was there any initiative at the time to encourage private physicians, singly or in groups, to extend the care they provided to underserved areas. The Medicare and Medicaid bills guaranteed no alterations in the way medicine was practiced, but instead placed the burden for reform on the medical schools.

The university medical centers were poorly prepared to accomplish what was expected. A more constructive change than merely enlarging the hospitals' clinics was called for. But the demand made of them was to deploy their resources, though these were mostly specialized and inappropriate for the task, in the neighborhoods of the poor. Medical schools were encouraged to establish ambulatory care centers and to conduct programs, based in the community, that they could not control and that had uncertain futures, dependent upon

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continued federal support. Further, the inadequacies the medical schools confronted had multiple social and economic causes, and were not amenable to the quick remedy that the federal initiatives prescribed. An important added dimension to the problem was often overt hostility from community leaders.

Medical school deans were criticized by a substantial proportion of the student body who voiced the public's opinion. The deans turned for relief, often without great conviction, to faculty members, chiefly in departments of community medicine or pediatrics, who enthusiastically attempted, while flying a medical banner, to influence the wide array of social, political, economic, and environmental factors that constitute the "pathology of poverty." The deans, however, needed to keep separate and external the projects that such faculty would undertake in order to protect the core of the medical schools' mission. A popular analogy to describe the medical school's jeopardy was that of operating a filling station with an unreliable supplier.

The medical schools' response to the War on Poverty was guarded. They did help to recruit physicians for neighborhood health centers, but avoided supporting and managing the facilities. They also helped to establish training programs for residents in the community, and made special efforts to recruit minority students for medicine. With direct federal support, new departments of community medicine were established, and departments of preventive medicine, usually small, were augmented, often under a different title to denote their new social objectives.

Anxiety was high among the majority of medical school faculty. They felt threatened that the public policy of the War on Poverty would somehow bring down the quality of medical education; they resented the contamination of the curriculum with social activism, a resentment shared by other educators who confronted the issue of open admissions to college. Many of the faculty involved in community projects were indeed activists, and the results of their activities were not likely at that time to be acknowledged and published in the *New England Journal of Medicine*. Most attempts to modify the curriculum to provide training in the social sciences or clerkships for medical students in community health settings met with vigorous resistance. Compared to the majority of the faculty, whose academic achievements were widely recognized, faculty involved in the community were at a severe disadvantage. They differed from physicians

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previously engaged in outreach in that, at this time, they had no well-defined and effective intervention to apply; they were considered medicine's "bleeding hearts."

Nonetheless, the accomplishments of the War on Poverty, in terms of access of the poor to medical care, were impressive. In 1982, over 80 percent of the population with low incomes had consulted a physician within the past twelve months; only 50 percent had been able to do so in 1970.[6] This change meant that, by the early eighties, the poor saw a physician as frequently as higher income groups. Two other gains for underserved communities that are attributable to the War on Poverty are the development of Head Start programs and many neighborhood health centers. To Medicaid, to a renewed, abundant supply of physicians, and to competition among hospitals for patients, can be ascribed the new appeal of caring for the poor. Medical schools had little to do with the Head Start program.

During the Nixon administration, the War on Poverty lost impetus, and public policy, aimed at improving access to medical care for the poor in their neighborhoods, was replaced by policies that encouraged the development of new medical schools and provided for a larger generation of family and primary care physicians, nurse practitioners, and physicians' assistants. Congress established in 1972 The National Health Service Corps that assigned physicians, who had received federal support for their medical school education and postgraduate training, to underserved areas. A series of health manpower bills, enacted between 1963 and 1976, created forty additional medical schools and tripled medical school enrollment. The medical schools followed through on these federal initiatives without difficulty for they were compatible with the schools' mission to teach and train people to provide health care.

The importance of the priority given to ambulatory care during the War on Poverty has now been fully acknowledged by the medical school. The hard benches, long waits, missing records, and large annual deficits—all familiar features of ambulatory care in the medical center during the War on Poverty—are not such common problems, now that the number of full-time faculty engaged in ambulatory care has grown. The private practice of ambulatory care has become an important source of income for medical schools, and they now foster contact with community hospitals. In today's competitive environment, the importance of efficient, well-organized

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ambulatory care is evident. Ironically, lack of federal interest in providing care for the poor, especially the uninsured, has become the major threat to the medical center.

Efforts to bring medical care to the community continued throughout the War on Poverty to the present. The deleterious effects of cigarette smoking were brought to public attention in 1964. Providing this conclusive evidence ranks among the greatest breakthroughs of the century in terms of its potential to prevent premature disability and death from lung cancer, coronary heart disease, and chronic pulmonary disease. The dangers of asbestos and other occupational and environmental hazards are also well-known. In these, as in other cases, there are physicians who provide the evidence to the public. Nevertheless the use to which the information is put depends on the willingness of society and its government to put in place restraints that will reduce the risk of exposure to such harmful materials.

Although much remains to be done to reduce the effects of personal, occupational, and environmental exposure of the public to hazardous agents, the U.S. public's health has never been better than in 1986. Most people survive beyond the age of seventy and often remain fit until the late decades of life. Many have been impelled to examine their personal habits and to alter their life-styles to maintain good health. Yet, even now that most Americans have assumed responsibility for their own health and enjoy improved health status, public interest in addressing the problem of excessive mortality and morbidity that remains among certain well-defined groups within the population has died down.

The U.S. health report card is generally favorable, but some outstanding failures bear mention. One striking example is the health status of some 900,000 American Indians living in or near reservations in eleven states. Their age-adjusted death rates in 1980 exceed average U.S. rates by 50 percent for pneumonia and influenza; by over 200 percent for complications of diabetes mellitus; and by about 600 percent for tuberculosis. Deaths following accidents on the reservation are as common as deaths from cancers of all sites in the U.S. population as a whole.[7]

A larger group is that of U.S. blacks who live in enclaves of poverty in rural and densely populated urban America and whose mortality experience is often not apparent from the average rates for the state. For example, among New York State's sixty-two counties, only

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eleven have excessive infant mortality rates, and these, with few exceptions, represent deaths of newborn blacks. New Jersey has a low infant death rate (9.1 per 1,000 live births in 1984, compared to 10.64 for the U.S.) but has very high rates in four counties that have substantial black populations.[8]

The factors contributing to excessive mortality among Native Americans and blacks are multiple—inextricable from the many deprivations of poverty. This suggests that outreach by medicine, without equivalent impact on the social and economic causes, might be ineffective. Fortunately, such pessimism has not prevented physicians from reaching out to neglected populations. Given the "black box" of the medical technology that has assisted most Americans, the principal task for today's outreach efforts must be to develop a system of care that will improve access to benefits in certain targeted communities—a strategy of including the poor in a wider regional network of care. There is no better example of outreach in response to residual inequities than the efforts of obstetricians and neonatologists to improve the outcome of pregnancy.[9]

In 1975, Keith Russell, then president of the American College of Obstetrics and Gynecology, raised the shibboleth "ten in ten," declaring that infant mortality in the U.S., which claimed 16.1 babies per 1,000 live births, would fall to ten in 1985. His optimism had two bases: the first was a series of effective technological advances in perinatal medicine; and the second, confidence that the benefits could be broadcast throughout a region by creating a network of that region's perinatal providers. The conventional wisdom in 1975 was that achieving cooperation among a region's multiple and predominantly private providers—hospitals and their staff—was an improbable goal outside the USSR or Cuba. In the U.S., there was a long history of failure to regionalize personal health services.

With the support of private philanthropy and federal initiatives to improve the outcome of pregnancy, regional perinatal networks were established throughout the United States. The network included all hospitals and physicians who provided perinatal services within the region. Participation called for the systematic identification of pregnant women who were at high risk. The region's specialized perinatal center, usually in a university medical center, assisted regional physicians and hospitals to upgrade their services; access to consultation and special services, aimed at reducing risk during the prenatal

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period, improved and facilitated the referral of a pregnant woman to the level of care she required.

The most visible and best documented regional demonstrations during the five years from 1975 to 1980 were eight funded by The Robert Wood Johnson Foundation.[10] The Foundation's program, strongly supported by Walsh McDermott, affected approximately 6 percent of the nation's annual number of births. A special federal initiative, in 1976, to improve the outcome of pregnancy fostered the development of regionalized perinatal care in thirty-four states. Though this care may not have been wholly responsible, the infant mortality rate in 1985 did fall to 10.6 per 1,000 live births. This fall in mortality—associated with a greater number of babies with low birthweights surviving—was not offset by increased disability among such survivors.

In 1979, with further support from The Robert Wood Johnson Foundation, many of the same physicians who promoted regionalized perinatal care broadened their efforts to bring special services to rural communities in ten states with excessive infant mortality. In these areas the mortality rates fell to the average for the state. This demonstrates that it is possible to improve the system of care in areas of poverty, even when the poverty persists.

The result of these successful demonstrations of perinatal outreach is the firm conviction that infant mortality in the U.S. can be reduced to the levels achieved by smaller European countries, with which the U.S. is often unfavorably compared. The application of available knowledge to well-defined pockets of excessive mortality in the U.S. remains a challenge. Special emphasis on the plight of the poor—on improving access of the minorities to good perinatal care—may seem like an echo from the 1960s, but there has been a distinct reversal of roles. Through its perinatal leadership, medicine is now the protagonist for the poor, highly critical of the federal government's lack of response. In 1981, through the Omnibus Budget Reconciliation Act, maternal and child health appropriations were reduced by 18 percent, and there have been no special federal initiatives during the Reagan administration.

The national preoccupation with containing costs for human services could stand in the way of vigorous efforts to address national health problems of any sort when there is no perception of danger to the majority. Medical institutions compete for survival in the mar-

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ketplace, and their capacity to care for patients who cannot pay is decreasing. The inequities remain and may even increase as large subgroups of the population are priced out of the medical care system. It remains up to individual members of the medical profession to protect the needs of the poor, until the inequities are once again broadly recognized.

The success of attempts to reach out to the public depends on the receptiveness of the majority—on what is essentially a political decision. In the early part of the century, outreach provided new protection for all and extended the frontier of human survival. In the latter half of the century, the strategy for outreach gradually shifted from interventions applied to large populations, to individual care in the personal physician system. An array of useful biomedical interventions is available in the U.S., and most Americans now have relatively easy access to them.

For most members of society there is little danger that they will be denied the benefit of some useful medical advance; communication to the public is rapid and any technological intervention is likely to become available and accessible. In addition, physicians who fail to offer the intervention may well face litigation.

The judgment of the majority about the problems of the relatively few and uninfluential in their midst will largely determine future projects. AIDS, perceived fully as the most important recent public health problem, is no longer the problem of but a few. Indeed, the public must not be allowed to lose sight of such problems, nor to resent the expenditure of public money on alleviating them. Although access to health care as a human right may pale when compared to personal freedom, a case can be made, in a relatively wealthy nation, to eliminate the means test applied to those born in the United States.

While the nation continues to celebrate the longevity of its citizens, increasing numbers of older disabled persons who lack adequate social and personal supports—perhaps 15 percent of the elderly U.S. population—will require care for which they cannot pay. The implications both for the medical profession and the rest of society are profound.

Despite the competitive financial aspect of medicine which, some feel, has made it lose its professional status, it can be expected to continue to generate new and useful biomedical interventions. How can these be brought to benefit the public? The short-term prospect is

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bleak. Is there a place in a public health system that is preoccupied with cost containment, or in the private health marketplace for outreach projects to benefit the poor and minorities? Abject pessimism may be tempered by presuming that the overriding financial preoccupation of today will be short-lived, and by faith in the relatively narrow but long line of physicians who have special compassion for the disadvantaged subgroups, and skills with which to address their problems. During the drought, perhaps private philanthropy may point the way toward redressing the nation's remaining inequities.

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Kurt W. Deuschle

Cross-Cultural Medicine: The Navajo Indians as Case Exemplar

EVERY KNOWN SOCIETY has its own indigenous health-care system, with diagnostic, curative, and preventive elements. These are valued and need to be seen as integral components of a particular society's belief system. Among surviving preliterate, traditional societies, these beliefs are usually embedded in their religions. Such societies are increasingly experiencing major social change, a modernization process that often involves the introduction of modern medicine, on the European or American model.

Since the acceptance and effectiveness of a medical encounter for any patient is to some extent dependent on the cultural compatibility of the physician providing the medical care and his patient, cross-cultural differences matter. The medical provider's awareness of and sensitivity to these cultural differences can be critical. In a heterogeneous society like the United States, transcultural gaps between the providers and the consumers of medical care may be as extreme in certain minority groups as any that are encountered within illiterate Third World societies abroad. The concern with this problem grew immensely after World War II, when wide-ranging technical assistance programs were introduced to assist developing countries everywhere.

In his now classic work, Benjamin Paul[1] cited a wealth of experience to show how cross-cultural obstacles could impede the introduction of Western-style medicine and public health technology. The cultural clash between scientific medicine and the health-belief system of a non-technical society was usually related to the lack of

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understanding and sensitivity on the part of the donor group to the cultural patterns of the other. Similar examples of misguided technological impositions are evident in education and in industrialization generally.

Clinicians and administrators of health projects have come to recognize the relevance of the concept of culture to the success of their programs. In 1970, with John Adair, I wrote:

> . . . in a nutritional program designed to combat deficiency diseases, *ex post facto* analysis revealed that the administrators had built organizations that were effective in working with the male population but had ignored the women responsible for the food preparation and childbearing. In another area a program in tuberculosis control had failed because of a lack of appreciation for religious sanctions, which had not been perceived as relevant by the Western trained physician. The anthropologist was able to point out to the practitioner of public health all-important linkages between the various aspects of the culture. But the skills of the anthropologist and the utility of cultural analysis were severely limited when confined to such after-the-fact consultation.[2]

The social scientists who reported health project failures were frequently not consulted until irreversible damage had been done. It became obvious that it made little sense to summon anthropologists to come in as consultants *post facto* to explain a failing or failed health program. They needed to be used as scientific members of the team of initial planners and designers; also, they were invaluable as implementors and monitors of ongoing projects. Dr. Walsh McDermott was instrumental in coupling social scientists with biomedical technology scientists. Only such teams could be expected to know how to provide modern medicine to a primitive society.[3] This interdisciplinary approach, once very novel, is by now well established.[4]

Perhaps the best documented illustration of cross-cultural challenge within the U.S. is the case of the Navajo Indian tribe in the southwest.[5] The Navajo Indian Reservation has sometimes been described as a Third World country within the United States, a nation vulnerable to the ever-changing policies of the federal government. Walsh McDermott was quick to recognize this. He was convinced that lessons learned in transferring modern medical technology to the Navajo people could be invaluable to international health efforts

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more generally. Indeed, he became sought after as a world health consultant largely because of his Navajo health experience. Working through the Institute of Medicine, the Agency for International Development, and the World Health Organization, as well as other international agencies and organizations, he provided a new kind of intellectual leadership. Placing health-care changes into the perspective of the history and life of the Navajo tribe made for a better understanding of how Western medicine can be inserted into a traditional indigenous health system.[6]

THE NAVAJO INDIANS AND THEIR HEALTH-CARE SYSTEM

The Navajo Nation of approximately 150,000 is the largest of the two hundred Indian tribes in the United States. Their reservation, on their own ancestral land, is a 25,000 square mile area on the southern edge of the Colorado plateau located in northeastern Arizona and parts of New Mexico and Utah. The Reservation, with its mountains, canyon, and mesas, intermingled with semiarid flat plains, is hot and dry in summer; winters, however, can be harsh and cold, with paralyzing, heavy snowfalls. On this largely barren land, the Navajos have moved from a livestock economy common before World War II to a wage economy, accelerated by the growing exploitation of their land for timber, coal, gas, oil, and uranium.[7] Despite this growing industrialization, however, unemployment is high; for the vast majority of Navajo families, *per capita* incomes are at or below the poverty level.

Dramatic changes in Navajo life-style began with their abandoning a wholly rural primitive existence to live in the small villages centered around the Federal and Tribal agency compounds. While their economy changed, they remained faithful to their traditional religion, concerned very much with establishing a state of harmony and balance between the individual and his total physical, social, and spiritual environment. Making no significant distinction between mind and body in their definition of health and disease, they see disharmony with some aspect of their total environment as the underlying cause of all disease.

Navajos see man as surrounded by danger; restrictions and taboos are common. They avoid contact with the dead, they regard lightning and thunder as possible causes of disease, imagine that touching a

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tree struck by lightning can cause tuberculosis. Fingernail parings, feces, blood, and hair must be carefully disposed of since such material can fall into the hands of witches who may then induce illness.[8]

The Navajo religion, with its many songs, rituals, and sand paintings, offered in ceremonies to cure disease or maintain health, depends on two main practitioners, the diagnostician and the Singer or Medicine Man. The diagnostician performs ritual acts, usually by hand trembling, gazing at stars, listening to noises in the night. Able to go into self-induced trancelike states, he determines the nature or the cause of the health problem. The appropriate ceremony is then prescribed. The ceremony itself is conducted by the Singer, using a complicated pattern that may require chanting, praying, herbal infusions, and sand paintings. These ceremonies must be conducted precisely; a ceremony improperly performed can cause disease rather than cure it. In addition to the ceremonies that cure, there are also ceremonies—the Blessing Way—that serve to maintain health. The Singer, in short, is able to drive out evil and restore harmony.[9] Each Singer is usually able to perform only a few major ceremonies; it takes years of dedicated apprenticeship with an established expert in a major ceremony to learn it. The diagnostician, by comparison, has no training; those with the aptitude for this role are generally self-selected.

THEIR ATTITUDES TOWARDS WESTERN HEALTH CARE

The Navajo peoples increasingly use Western-style health care, often coupled with their traditional, indigenous health system. They have no serious problems in using both systems of care, as an elderly Medicine Man, Sam Yazzie, has explained:

> I have great respect for white doctors; there are things they can do that we cannot. For example, they can take out a gall bladder, or treat a urinary tract infection. They also can take out a section of the intestines and sew the patient's stomach up again so that he will recover.
>
> There are certain sicknesses that a doctor can never cure that we can—lizard illness, for example—or an illness that comes from one of those small green worms you sometimes find on an ear of corn. Sickness might last over a long time and it might be a lingering illness. No white doctor can cure an

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illness of that type, only a medicine man can cure such patients . . . In any situation when a patient isn't getting better then I, or any other medicine man who knows his business, should allow the patient to go to the hospital and have his x-rays and other treatment there. Then he can come back and have the rest of the sing in the hogan. This has happened many times even right here at Pine Springs to our own children. They have started a sing here, the children don't seem to be getting any better, we then let them go to the hospital, and then, after they come back, we finish the ceremony. Even after a period of more than 3 months we will complete the ceremony if it was left unfinished. That is most important, especially with the Beauty Way ceremonies; they must always be completed.[10]

In the early 1950s physicians providing medical care to the Navajos were just beginning to appreciate the fact that modern medicine could coexist with the traditional Navajo health-belief system. The fact that a Navajo had accepted modern treatment of tuberculosis did not necessarily mean that he had abandoned his traditional beliefs, as the following report suggests:

In 1952, Mr. Manuelito Begay, a respected medicine man and Tribal Councilman, attended a health education program at a Reservation tuberculosis sanatorium. The cause of tuberculosis was demonstrated as the tubercle bacilli which he was shown under the microscope. Peering into the eyepiece of the instrument, Mr. Begay exclaimed: "Today I have met the enemy of the Navajo people!" However, our conviction that this Navajo medicine man had been dramatically converted to the germ theory of tuberculosis was soon dispelled. For, several months later, when the field studies were being presented to the Navajo Tribal Council, the "convert" arose to speak. At one point he gestured to the physicians, and the Council responded with peals of laughter. We later learned from the interpreter that Mr. Begay had generally praised our work and had said the "white doctors" and the Navajo medicine were working for the same goal—good health—even though they might have their differences in concepts. The laughter had been evoked by his statement:

"These doctors tell me tuberculosis is inflicted by a person coughing in your face. Right away I disagree with it. A person should not be that weak to be susceptible to a man's cough. We have a definite point in mind and know how a man gets to be afflicted with tuberculosis. One is the ceremony about the wind chant. If something goes wrong with that it is tuberculosis; and if lightning strikes you, tuberculosis is the result."

This elder was trying to teach us the folly of spending too much time on conceptual differences to the neglect of practical measures. Miscommunica-

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tion can emerge in attempting to simplify scientific medicine to perceptive but nonliterate people. During a field survey of the tuberculosis problem in the Reservation, a group of physicians stopped at the hogan of an elderly Navajo woman. The doctors told her about the general purpose of their visit. When she asked these doctors what was the cause of tuberculosis, they answered that it was something in the spit from a person sick with the disease. Upon hearing this, the Navajo woman shook with laughter and pointed to an old scraggly rooster strutting around the hogan. "In that case," she said, "that old rooster should have been dead from tuberculosis a long time ago—he's always pecking away at the spit all around here!"[11]

THE APPLICATION OF CULTURAL KNOWLEDGE

Entrenched beliefs in the traditional concepts of etiology and treatment of tuberculosis persist and exert a real influence both on the Navajo patients and on the effectiveness of physicians who treat them. Using the cultural knowledge of the Navajo healing system, one can apply their belief system in a way that solves a health-care crisis, as the following example shows:

In 1954 a group of fifty Navajos were hospitalized in an off-Reservation sanatorium in Tucson, Arizona, some 200 miles away. During a violent summer storm, lightning struck a nearby palm tree. Shortly thereafter, these patients became restive, and several decided to leave the hospital despite all attempts to reassure them. A hurried telephone call was made to the Reservation health office. After advice from the Reservation physicians concerning the attitude about Navajo lightning taboos, it was decided to call a medicine man to perform a ritual neutralizing the evil produced by the lightning. A Navajo medicine man from Fort Defiance was flown to Tucson. A ceremony was performed with the ritual chanted over an "intercom" system. Anxiety was relieved and peace of mind restored.

Families also have demonstrated changing attitudes and behavior patterns to modern medicine. Among other things, this influences the decision whether a patient will remain in the hospital or go home for a Navajo ceremony. For example, on many occasions, a patient's relatives would ask for his clothing as they left after a visit to the sanatorium. They would explain that they wanted to launder them in preparation for the patient's discharge. Careful inquiry, however, elicited that they were not really interested in washing the garments but in using them as a proxy for the patient in a "blessing or healing" ceremony.[12]

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I was unaware of the belief in witchcraft when I was first assigned to provide medical care for one hundred hospitalized Navajo tuberculosis patients in 1952. I directed the nurses to initiate rectal temperatures for more accurate charting of patients' temperature patterns. After the very first attempt to implement the procedure both the Navajo hospital aides and the patients threatened to leave the hospital. After consulting a Navajo nurse, I realized their fear was of being accused of witchcraft. A too casual approach to the problem of the coexistence of modern and traditional medicine can erode confidence.

In the early 1950s at the Fort Defiance Indian Hospital, a surgeon admitted a severely burned patient. A week after treatment the patient and her family demanded discharge so that a Medicine Man might perform a ceremony. The surgeon was fearful that a premature discharge might cause lethal complications. In his eagerness to keep his patient in the hospital, he invited the family to bring a Medicine Man to the bedside to perform some aspects of the traditional ceremony in the patient's room. The family agreed and the Medicine Man was left in the room with only the patient and family. Apparently, herbal infusions were spewed over her burns. She promptly developed sepsis and died.

A physician unfamiliar with Navajo culture may unwittingly conclude that, because Navajo patients are able to endure painful procedures such as venipunctures, they must have a high threshold for pain. This was the opinion of an obstetrician at the Navajo Indian Reservation Hospital, who administered miniscule amounts of analgesics to the Navajo women in labor, believing that the Navajo felt very little pain during the birth process. He attributed this to the "natural reaction" of Navajo women in childbirth. In time, he was succeeded by an obstetrician who gave heavier doses of analgesics. Within months the obstetrical service was flooded with patients. When the Navajo patients were asked about this sudden increase in admissions in this particular hospital, they replied that they wished "to have a baby without pain." The stolid and undemonstrative Navajo can inadvertently convey misleading impressions to the culturally unsophisticated doctor.

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IMPLICATIONS

A number of significant principles have emerged from these Navajo experiences that may be relevant to other cross-cultural situations.

Despite growing Navajo reliance on modern medicine and surgery, John Porvaznik found "that one-fourth openly request postponement or a break in hospitalization to have a sing; another one-third admit to having a sing when questioned about it, the remainder either are noncommunicative or deny having anything to do with the 'Navajo way.' "[13]

The importance of supporting the local health-care systems is unequivocal. If the Medicine Man becomes an endangered species, a great void will occur in the healing of psychosomatic illnesses. The present atrophy of the traditional healing system has been caused not only by the effectiveness of modern medicine but by changes in Navajo society's economic structure. Young people are no longer able to afford to spend many years in the apprenticeship role learning extended ceremonial sins.

The Cornell-Navajo Project is an early model for what has become a thriving American field of medical anthropology. Nothing like it existed before World War II. While individual scholars such as Erwin Ackerknecht[14] had conducted significant studies of primitive medicine, a team effort by anthropologists, in partnership with physicians, was virtually unheard of. It became a model of applied anthropology, that distinguished the American from its British counterpart.[15]

The result was a proliferation of empirical studies of medical systems, including studies of Baja California (Mexico), rural Servia, Filipino peasants and city-dwellers, the Admiralty Islands, the Fipa of Tanzania, the Yoruba of Nigeria, southwest United States Hispanics, and rural Vermont.[16] As these and many other studies created a body of knowledge about human disease ecology and adaptation to disease, about indigenous customs related to health and sanitation, ethnomedical systems, and medical systems in acculturation and change, the field of medical anthropology achieved a new status. The Society of Medical Anthropology, which did not exist when Walsh McDermott took his team to the Navajo reservation, is now a thriving professional organization of some 2,000 members, whose work appears in a great variety of journals.[17]

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The pioneer Cornell Project contributed to an understanding of the medical ethnography of a traditional society in the process of adapting to modern society. It provided a detailed description of the relations between indigenous belief systems and modern Western beliefs, charting major interactions and effects. The roles of the native healer are etched in striking detail; they are analyzed with special reference to the benefits that occur when traditional cultural practices are viewed with respect, when they are not seen simplistically as anachronistic indigenous customs and practices that wait to be replaced.

ENVOI

Why was Walsh McDermott's leadership in cross-cultural medicine so important? He seemed almost to personify the qualities needed for cross-cultural work. Able to transfer his thoughts simply, directly and effectively, whether speaking to a Navajo leader or a Navajo shepherd, even when he spoke through an interpreter, he maintained eye contact; his sincere and responsive smile transmitted warmth and understanding.

He knew instinctively that one legitimated clinical trial or new health-care delivery only through the tribal leaders and the local leadership. When he introduced isoniazid on the Navajo Reservation in the early 1950s, he reviewed the entire procedure with the Navajo Tribal council. He was fair, ethical, and honest in his presentation. He established trust, never "talking down" to the Navajos. He respected their indigenous healing system.

Recognizing the importance of the social sciences, knowing how anthropology could contribute to cross-cultural health projects, he consulted with Tribal and local Navajo leadership. As the project was implemented, Walsh encouraged social science research on the health behavior of Navajos. Tuberculosis, infant diarrhea, infant feeding, congenital hip disease, and many other conditions were investigated in depth.

When the Cornell-Navajo Project came to the end of the six years contracted for by McDermott and the United States Public Health Services, the Navajos had witnessed the development of a community-oriented primary care program that had been truly responsive to the community, had involved the active participation of

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both tribal and local Navajo leaders. McDermott's impact on cross-cultural medicine had spread far beyond the boundaries of the Navajo Indian Reservation; his style and model of working impressed others. The Navajo experiment was more than a parochial happening.

ENDNOTES

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Eric J. Cassell

The Changing Concept of the Ideal Physician

THE INCREASING CONCERN WITH ETHICAL ISSUES in medical practice and research over the last fifteen years exemplifies a striking change in the image of doctors and the relationship between physicians and patients. Where previously physicians' decisions were rarely questioned, patients are now frequently sceptical and may doubt both the physician's motives and judgement. Concurrently there has been a rise in concern about the nature of the physician's act and a strengthened interest in teaching physicians how to be doctors as opposed to merely teaching the scientific basis of medical practice. During the latter part of his career, Walsh McDermott was interested in Samaritanism—the human dimension of the physician-patient relationship. Because good medical care of necessity involves some degree of altruism on the part of physicians, he was interested in what fosters this altruism or defeats it. These changes in the relations of physicians and patients and the manifest interest in some systematic understanding of problems such as altruism represent a startling evolution over what is, historically, but a brief period.

Sorting out the contributory factors is complex. These changes in the conceptions of physicians and physicianship occurred during the period in which science had its most profound impact on the ideals of medicine and in which technology entered medicine on a grand scale. This all occurred at a time when the surrounding society was also undergoing a profound shift in its self-understanding. Let me use four brief points to summarize the argument.

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First and foremost, medicine's total embrace of science entailed profound effects on the conception of physicians and physicianship. It is difficult for doctors trained in the last two generations to dissociate medicine and science, but the historical ideals of the two are distinctly different. Science is based on a belief that it and its methods are value-free—anything that happens in nature is neither good nor bad, it simply *is*. On the other hand, medicine has a historical tradition in which a hierarchy of values is firmly established. In addition to being putatively value-free, a scientific description does not ascribe *qualities* to things; adjectives like warm, tall, swollen, or painful are meaningful for persons; but, ideally, science deals only with temperature, vertical dimensions, diameters, or nocioception. It is obvious that medicine could not exist without reference to qualities and their meanings to humans. Moreover, science does *not* deal with individuals, it deals with—and its methods are only suited to—generalities. Above all else, medicine is concerned with individuals. Science and medicine are inextricably bound, and medicine without science is nothing; but the paradoxes and strains produced by believing they are the *same* led to a conception of the ideal physician that could not last. Thus, part of the changing idea of doctors over the last fifty years is the result of the impact of an unreal ideal of the connection between science and medicine that is now evolving to a more balanced view of their relationship.

My second point is that the effect of technology, in its general sense, has altered the character of physicianship in these last fifty years. I believe that the impact of technology is not fully comprehended because of the mistaken idea that the effects of science and those of technology on the thinking and behavior of physicians are the same. Because of this confusion no discussion of the changing conception of doctors can be complete without reference to the special effect that the disarming simplicity and certainty of technology has had on physicians. It is the burden of doctors to have great responsibility in a sea of doubt and uncertainty. The intrinsic promise of technology—that it will relieve uncertainty and lighten doubt—is virtually irresistible given the special circumstances of medical practice. Despite the countless benefits of technology, uncertainty and doubt remain, although often shifted or concealed.

My third point is that the effect of these factors on the character of physicians took place over enough time for the usual forces acting in

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the affairs of humans—politics and the succession of generations—to combine and alter the dominant group of physicians in the United States from the academically minded clinicians (and their organizations) to the full-time medical research scientists of the academic medical centers who embraced and exemplified the new values.

The fourth point is that since the Second World War the meaning of the words "person" and "individual"—central to American beliefs—have been undergoing profound alterations. Since physicians are persons who treat persons it was inevitable that this social turmoil eventuate in a new understanding of the nature of doctors, patients, and their relationship. This redefinition of patienthood and its expectations has been sharpened by the fact that the present generation of Americans, raised in the midst of technical and scientific complexity, have become so knowledgeable that (it is believed) physicians can no longer lay sole claim to medical knowledge.

Among the changes in the social climate have been the well-known distrust of science and the rise of the bioethics movement in which the preeminence of the patient is stressed.

I conclude that the physician of the present era is buffeted by conflicting ideals within medicine itself and in the surrounding society. From all this has grown a movement within medicine to begin to redefine doctors with a stress not only on the scientific basis of medicine, but on the character of physicianship. Walsh McDermott was one of those prominent within medicine who became concerned with these issues early on. His ideas on the nature of the good physician form the basis for such a description.

THE EFFECT OF SCIENCE ON THE IDEAL OF THE DOCTOR

Perhaps apocryphally, it was said in the 1950s that, in a display case in the Department of Radiology of the Massachusetts General Hospital, a stethoscope was shown as an obsolete instrument. That display case is symbolic of the belief commonly held during the same period that scientific medicine and its attendant technology would render obsolete the individualism and subjectivism that, the same conception held, had so hindered medical progress. The time of great clinicians, some of whom were Walsh McDermott's teachers and contemporaries, was believed to be over. How different from the end

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of the nineteenth and beginning of this century, when American physicians were greatly concerned with the part their individual traits and behaviors played in their physicianship. A book called *The Physician Himself* by D.W. Cathell was popular for many editions as it discussed in detail appropriate dress and demeanor for the successful physician.[1] In the early decades of this century, as in previous centuries, clinicians might achieve prominence, and be regarded highly just because of their individuality. During the decades that followed World War II, on the other hand, such individualism came to be viewed negatively—science was the physician, although it necessarily worked through the hands of individuals. Similarly, the term "anecdotal medicine" came to be seen as the equivalent of subjective contamination and to stand for sloppy, unscientific medicine. Since individual experience is ineluctably anecdotal (one can have no other kind of experience), and individual clinical judgements ineluctably contain subjective elements (they are the product of a subject), banishing the subjective and anecdotal from medicine necessarily demotes the individuality of the physician to the level of a contaminant.

The philosophical basis of early twentieth-century science that medicine embraced could have it no other way. Medical science is founded on several postulates that allow of no divergence. Science attends to objects that are free of value and quality, separate from one another, and whose workings can be known by the analysis of their parts. The basis of all function is structure, and any alteration in function must be related to a change in structure. Everything about the human condition will ultimately be explained in physicochemical terms—things like mind, soul, or what have you, are an illusion or at best an epiphenomenon.[2] (The reader will recognize that current concepts of science have softened some of these stances—albeit without satisfactory alternatives.) Because of these postulates medical science could not deal effectively with individuals, value-laden objects, things that change over time, or wholes that are greater than the sum of their parts. Since that list contains the characteristics of persons (be they patients or doctors), medical science could not handle persons—but disease lay clearly within its purview. The phenomenal success of medical science in showing how the body works in health and disease requires no comment.

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THE PROMISE OF SCIENCE: TO KNOW THE DISEASE IS TO KNOW THE ILLNESS AND ITS TREATMENT

Knowing about disease was what counted. The history of the era of scientific medicine really starts with the "discovery" of diseases by the Paris School of physicians in the 1830s, the first to provide clinico-pathological correlation. The enormous success of modern medicine appears to rest completely on the combination of disease theory and science. Thus, physicians could come to believe that to know the disease and its treatment is to know the illness and the treatment of the ill person. This provided further grounds for the idea that individual physicians count for little, *as individuals;* it is their knowledge of disease and medical science that cares for the patient. In this thinking, a disembodied knowledge connected to some sort of effector agent would do as well. With this in mind, one should not be surprised at the numerous attempts to formulate computer diagnosticians or therapists. That they have all failed (unless making the diagnosis of a *New England Journal of Medicine* Clinical-Pathologic Correlation is to be considered success) should have given pause to the underlying conception, but it does not appear to have had that effect as yet. The uncomfortable fact that remained was that doctors could not get at diseases without dealing with patients—doctors do not treat diseases, they treat patients. Further, the same disease in different individuals may have a different presentation, course, treatment, and outcome, depending on the individual and group differences among patients—from personal idiosyncrasies to genetic or anatomic variations. The scientific basis of medicine neither recognizes nor provides a methodology to deal with such individual variations on the level of patient-doctor interactions. Such issues were relegated to the "art" of medicine or to individual judgement.

But that does not represent a successful solution to the problem since much of medical practice is thereby swept under the rug. Science has solved only half of the problem, a systematic basis has been provided for understanding the body and its ills, but the other half—that having to do with sick persons—remains "art." Art is, by definition, based on individual skills so that medical practice remains shackled to the problem presented by the differences among individuals—both patients and doctors—and to subjectivism. Attempts to get around this by establishing a scientific basis for dealing with

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values and human qualities, such as Feinstein's proposal for "clinimetrics," are doomed to failure because science cannot deal with that which it does not recognize as existing.[3]

Instead, each physician must solve the problem internally. The fundamental paradox and strains caused by conflicting demands on the doctor were not apparent because the transition from the dominance of the eminent clinicians to medical scientists was not abrupt. Academic physicians of Walsh McDermott's cohort, such as Paul Beeson and Eugene Stead, had been trained by the clinicians of the previous era; while they may have passed on to their students the ideals of scientific medicine, they contained within themselves the values of the Samaritan functions of the personal encounter system, an important aspect of the art of medicine. Walsh has noted that the change in hospital architecture from large open wards to small rooms effectively moved the human-support functions of the professor making rounds from the public to the private arena. Whereas previously every act of the attending was open for all to see, it became common to demonstrate the physical findings or discuss the patient's disease in the presence of students and house officers, but then to ask them to leave the private or semi-private room as the attending physician turned to more personal matters of supporting the sick person. But hospital architecture alone cannot be blamed. I remember, in the 1950s, an attending physician teaching students in the outpatient clinic about the care of patients with congestive heart failure. The discussion was couched in terms of the pathophysiology of the failing heart, and neglected entirely such issues as acquiring some understanding of who the patient was, empathy, support, and the understanding of everyday life and function necessary to insure that the patient followed the prescribed diet, took medications as ordered, and in general lived a life that would maximally enhance the function that his failing heart might support. I suspect that the attending physician was living up to the new ideals of scientific medicine and attempting to pass them on to the students, and that the subjectivity inherent in the other issues was actively demoted from importance.

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THE IMPACT OF TECHNOLOGY

Physicians have a reputation for conservativism, at least politically, that is generally attributed to their economic standing. But anybody who has ever tried to get them to alter their ways in medicine itself would be happy to tell you that their resistance to change (a characteristic usually associated with being conservative) is as great in medicine as in other aspects of their lives. That resistance to change appears to be related to the combination of the uncertainty and the dire responsibility that are dominant characteristics of the physician's life. The simple fact is that it is frequently difficult to be certain of what is the best thing to do in the face of serious illness. In response to both the burden and the uncertainty, physicians and surgeons may become set in their ways, dependent on recipes for diagnosis and treatment rather than on the thoughtful examination of alternatives.

The physician's resistance to change melts away at the promise of greater certainty—witness the truly rapid embrace (and even overuse) of effective therapies and many current diagnostic techniques from endoscopy to computerized axial tomography. It is not surprising, then, that doctors often embrace clinical methods and systems of thought that promise greater certainty even when the promise deceives. The clinical certainty promised by scientific medicine to the degree that it was believed that personal experience could be dispensed with, was such an illusion.

Uncertainty exists not only within the patient and because the future course of the illness must be judged, but also within the practitioner. In this regard, uncertainties that arise because of ignorance on the part of an individual doctor and the incompleteness of medical knowledge in general are most often cited.[4] Such uncertainty, I believe, is not what weighs most heavily on the practitioner. In the clinical setting, judgements must inevitably be made on the doctor's personal experience of past cases; the comparison of the present size, sound or feel of something with what is remembered; and on what a clinician believes to be the problem, based sometimes on very scanty evidence. The opening sentence of the first aphorism of Hippocrates—"Life is short, and the art long; the occasion fleeting; experience fallacious, and judgement difficult"—suggests that this has always been the case for physicians.

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Objective clinical technics such as x-rays, indeed the whole panoply of modern medical technology, seem to offer the possibility of banishing the uncertainties of subjectivism. It is not clear why the fact that the x-ray may be objective but that the physician's assessment is subjective and varies from individual to individual becomes lost from view—but that is the case.[5] Call to mind an ICU with monitors blinking and beeping and remember how all eyes (even family members') go to the monitors—and away from the patient. It requires effort *not* to watch the monitors. Technology—machines, instruments, drug treatments—like blinkers on a horse, restrict and define and thus simplify the viewpoint. But, unlike blinkers, technology also defines the values that represent good or bad, success or failure. The values of technology are unambiguous and nonmetaphorical, unlike other things in the clinical world. Numerical readouts seem certain; they do not announce their fallibility. Watch a cinearteriogram of the heart and you believe you are watching the patient's heart, instead of a movie of one representation of a heart (which, because of the possibility of mislabelling, may not even be the films of the patient's study). The existence of antibiotics provides the pressure to find an infection to treat—even if infection, while perhaps present, is not the patient's problem. Endless examples could be provided to document the well-known phrase, "technology is sweet." Its power to oversimplify the inherently complex and to produce certainty where doubt is necessarily present has proven irresistible not only to medicine but to the whole culture. Even the modern quack provides patients with computer readouts of blood, hair, or what-have-you analyses to give credence to the incredible. Wistfully, some have believed that the only solution to the dilemma posed by the enchantment of technology is its banishment. That seems patently ridiculous; none of us will willingly return to lesser effectiveness even if our patients would permit it to happen—and they will not. Little wonder, then, that the image of the physician has been transformed by technology so that technical wizardry has become more important than the cognitive skills previously associated with the ideal doctor. It is important to see that this effect of technology is separate from the transformation wrought in medicine by science.

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SHIFT OF POWER IN THE MEDICAL ESTABLISHMENT

Related to the changes wrought by science and technology was the manner in which the rise of scientific medicine undermined the status and power of medical authorities whose eminence was based primarily on clinical achievement. Since many of these elite clinicians were private practitioners as well as members of medical college and hospital faculty, the increasing prominence of scientific medicine acclerated the shift of power in medicine toward the full-time faculty of the medical schools. These changes in relative power are reflected in the authorship of Cecil's *Textbook of Medicine*.[6] Originally Cecil, an academic private practitioner, realized that one individual could no longer stand as an authority in all of internal medicine, so his book was written by specialists in the diseases about which they wrote. With the passage of time and the rise in scientific medicine, he invited Loeb, a full-time academic, to join him as editor. Ultimately, the editorship of the book passed entirely into the hands of full-time academic physicians. It must be understood that these changes in the relative power of clinicians and the new breed of medical scientists were not occurring in a cultural vacuum. During the same period that saw a shift in power within medicine from the clinician (to use a shorthand) to the medical scientist, the American public was according medicine increasing prestige and power, based on a growing respect for science.[7] Thus, as is so often the case, the change in what was to be beheld as the ideal physician, arose from a complex of reasons related to beliefs about science, to the superiority of scientific medicine, to the impact of technology in the doctor's world of uncertainty and doubt, and last but not least, to matters of power.

MEDICAL POWER SPREADS TO THE LAITY

It is not surprising, then, that a generation of physicians should have come to power for whom the scientific and technologic aspects of physicianship represented not *part* of being a doctor, but medicine and its practice incarnate. These changes in the model of the ideal physician from individualistic clinician to research scientist were coupled with logarithmic increases in the therapeutic and diagnostic power of individual doctors. As discussed elsewhere in this volume, the American public embraced the wonders of medical science and

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technology, further enhancing the reputation of medicine as a science, and of medical scientists. Funds for research poured in, and the enterprise of modern technologic medicine grew. Americans not only supported medicine's expansion, but became *knowledgeable* partners. For hundreds of years the power of physicians has come from their specialized knowledge and their status. During this last generation the scientific knowledge of medicine has become increasingly accessible to lay persons. Indeed, the public has shown a voracious appetite for scientific information so that, for the past several decades, science has been front-page news. It is apparent that the possession of some knowledge of medical science does not make a person a doctor. While physicians enjoy stressing that fact, they miss the point. *The promise of scientific medicine is that the knowledge does the work.*

Knowledgeable patients do not believe that they are doctors; their belief is that a piece of knowledge that is the same as the doctor's will do the same work for the patient as for the doctor. Witness the phenomenon of the *Physician's Desk Reference,* which many physicians find so irritating. The patient calls the doctor after arriving home and looking up the prescribed drug in the PDR. The patient is upset that a drug with such side effects was suggested. Wasn't the doctor aware? The physician knew what the side effects were, but believed that they were of such small probability that they were of no consequence. Further, the doctor is upset that the patient was not trusting. Trust is not the issue (at least in part); a fact is a fact—as true for the patient, it would seem, as for the doctor. If the doctor—an individual with trained judgement—is left out of the picture, a fact *is* a fact. Another fact is that no piece of knowledge floats free. All are connected to other facts and to underlying beliefs, and all are applied only on the basis of individual judgement. Where did the patient ever get such an idea? Individual physicians may argue that they do not believe that they themselves are insignificant or that only medical science does the work. Individuals may not hold such beliefs, but the system of medical education of the last several decades is clearly founded on that belief. That is the basis of the current practice of having the intern be the patient's doctor and of excluding attending physicians from writing orders on their own patients. Science, this practice implies, makes all of us equal before the mysteries of disease, and technology is the great therapeutic equalizer. Those who know

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best what nonsense this is and who pay the heaviest price for it are, of course, the interns (and the patients).[8] If it was not believed that the scientific facts about disease do the work, physicians would be manifestly trained about how to be doctors, how to make judgements, how to use their own individuality as part of their medical skills. If the doctor and not medical science is the agent of cure, why have physicians not been trained in that belief? It is only in the past few years that systematic attention has been given to such training.[9]

SOCIAL TURMOIL AND THE CHANGE IN THE CONCEPTION OF PERSON

The matter does not end there. It does not seem reasonable that simply owning a piece of knowledge should embolden patients in its use. Something has happened to displace physicians from their previous preeminent status, something powerful enough to allow patients to express the common belief that "doctors aren't Gods."[10] In fact, the fall of doctors from absolute authority on matters of health occurred at a time when all authority found itself challenged. We are all aware of the turbulence of the 1960s and the change in the relation of individuals to authority that began to occur at that time. So much confusion attended the changes of the sixties that it will require decades for historians to sort it all out. The anti–Vietnam War movement muddles the issue, because it is possible to see the period as primarily concerned with the war. However, the authority of the Catholic Church was crumbling at the same time; German students were on the barricades; the French were in turmoil. These aspects of the social disturbances of the times cannot be blamed on the Vietnam War. Rather, it would seem (in retrospect) that a new wave of individualism was breaking over the Western world—most marked in the United States. In this instance the old political individualism of the United States found itself being succeeded not merely by the individualism of effort considered so characteristic of the United States, but rather by a personalized—me, myself, and I—individualism that stressed differences and an interiority of person not previously known. Have individuals in any culture *ever* revealed so much of their private lives? (There is some irony in the fact that physicians were the bastion of individualism in the thirties through the fifties when American society was dealing with the problem of

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anomie created by advancing industrialization—see Chaplin's movie, *Modern Times*—and the growth of the modern corporation. Then, at a time when individualism was again becoming a vital force in the culture, physicians became almost faceless.)

It is no surprise that the changes in the society have had a profound effect on medicine. These effects can be noted in the relationship between patient and doctor and in the rise in the bioethics movement.

CHANGES IN THE DOCTOR-PATIENT RELATIONSHIP

During the period spanned by Walsh McDermott's career as a physician, the belief that "doctor knows best" virtually disappeared. During this era, the nature of the relationship between doctor and patient has come under scrutiny, and it has become apparent that the relationship itself is a powerful force in medical care, that it can be endangered, and that it can change as a result of social as well as personal forces.[11] From being seen as effectively passive in relation to the physician (except that patients have always been expected to be active in the sense of "fighting to get well"), patients now frequently believe themselves to be active partners in their care. They want to take part in decisions formerly reserved for the doctor; they want to exercise choice in therapy and they have high expectations about the outcome. These expectations have been nourished by the media and the exploitation of medical achievements by medicine itself in its quest for public support. The force of these changes can be demonstrated by examining the change in the way cancer of the breast is treated. The radical mastectomy of Halsted remained the treatment of choice from the early part of this century until this last decade. When I entered practice in 1961 it would not have been uncommon to tell a patient who had awakened after surgery for a mass in the breast, that, "we had to remove the breast because there were some suspicious cells." The patient would not be told that she had carcinoma of the breast. Telling patients the truth about their malignancies was considered bad for them—a potential cause of suicide. It is essential to realize that these deceptions were not something "done to" unsuspecting patients, who, themselves, were the same then as now, because that is not the case. McIntosh has documented the attitude of patients and doctors in this regard in Great Britain where ideas about truth-telling lag behind the United

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States. There, doctors do not believe patients should be told the painful truth and neither do patients. The patients generally know the truth nonetheless.[12] To understand how both physicians and patients have changed during this period, it should be remembered that thirty years ago personal sufferings, unhappiness, and even doubts were largely kept private, whereas today such matters are much more likely to be ventilated. Doctors were not thought to be interested in their patients' personal problems (except as mere kindness), but to confine themselves to the "medical" aspects of a case—i.e., the physical. It would now be virtually impossible, in the United States, to conceal the diagnosis of malignancy under euphemisms such as "suspicious cells." A doctor who does not understand this, or who is insensitive to the unhappiness of his patients, would now be considered a technician. Many women have definite ideas about proper treatment for breast cancer, and, further, they may feel that the surgeon is as much their enemy as the tumor. I consider it is these beliefs that have forced surgeons away from the Halsted radical mastectomy as much or more than developing scientific evidence which followed the changing opinions of patients. Changes in patients' attitudes are manifest throughout the range of medical services and are matched by the rise of commercialism, free-standing, for-profit emergency care centers, advertising, medical marketing, and other evidences of the demystification of physicians and medicine.

THE CONCURRENT RISE OF INTEREST IN ETHICS IN MEDICINE

In 1966, Henry Beecher demonstrated the failure of investigators to protect the interests of their research subjects in a number of major projects.[13] His 1966 paper is frequently cited as a landmark denoting the start of the present interest in bioethics. Catholic ethicists had always addressed specifically Catholic concerns in medical care, and the theologian, Joseph Fletcher, published a work in the fifties discussing ethical issues in medicine, but it was not until after Beecher's paper that concern became widespread. In 1966, for the first time, prior review for protection of human subjects was required of all United States Public Health Service grants. The Institute for Society, Ethics, and the Life Sciences (The Hastings Center) was formed in 1969, specifically to address moral problems raised by

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biomedical advances. In 1973, The Department of Health, Education and Welfare (now the Department of Human Services) published its first set of proposed regulations on the protection of human subjects. Then, in May 1974, investigators were presented with final regulations that specifically discussed the nature and duties of Institutional Review Boards. The requirement was widened in 1981 so that all institutions receiving federal research monies had to establish Institutional Review Boards to insure that research is conducted according to ethical standards. By now, concern for the rights of research subjects and patients has become an established fact of medical life.

Central to any understanding of the moral is the concept of person. Ethical standards, rules about good and bad, right and wrong, rights and their corollary obligations, matters of custom and conscience that guide the moral aspects of life are always in terms of persons (even though they may be directed towards non-human matters, such as animals or the environment). It follows that all understandings of the moral are based on some idea of the nature of persons, whether manifest or latent. In our era in the United States, the picture of the person that has most often been embodied by the bioethics movement is of a free-standing, autonomous individual, whose highest values are freedom and independence. The impact of this picture of persons on medicine, and its distance from older American concepts (still embodied in Europe) can be found in a paper by Pedro Lain-Entralgo on the subject of the "good patient,"[14] and the commentary on that paper by Childress.[15] For Lain-Entralgo, just as the physician has obligations to the patient, the patient has obligations to the physician and to the work of getting better. Both are embedded in a social matrix, and their obligations stem not only from themselves, but from the *fact* of their relationship and the *fact* of its ineluctably social character. For Childress, who represents a stance much more common among American writers on bioethics, the disease, the doctor, the relationship with the doctor, and the social setting pall in importance next to the patient's rights as an autonomous being. Freedom and self-determination represent values more important than recovery from illness.

Clearly, autonomy is threatened by sickness. Most physicians believe that the patient's independence and freedom of choice are removed by the effects of disease—by the uncertainties and impediments to understanding and action that inevitably accompany serious

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illness. In fact, helping patients regain autonomy would seem to be a prime function of medicine.[16]

Often, in the current scene, physicians are seen as the threat to the patient's autonomy—they are believed to be paternalistic, authoritarian, and too concerned with profit to be reliable servants or partners in care. (It has frequently been pointed out that these characterizations are usually attached to doctors other than the speaker's or respondent's own, who is generally believed to be more caring and compassionate.) In the same manner, modern therapeutic agents are often viewed with the suspicion that their side effects are more prominent than their benefits. During their convalescence from serious infection, for example, patients may attribute their fatigue to the effects of the antibiotics, rather than to the illness from which they are recovering.

There is some evidence that a single-minded concern with autonomy is beginning to pass from the bioethics scene.[17] Ethicists are beginning to focus more on the contact between doctor and patient as a relationship, and to broaden their interests to include understandings of not only rights, but corollary obligations.[18] There are other indications that the study of ethics in medicine is maturing and coming to be more concerned with moral problems in medicine than with moral philosophy *per se*.[19] However, Stephen Toulmin has made it clear that the relationship between philosophy and medicine has been two-sided, that philosophy has benefited greatly from the infusion of real-world problems and the sense of urgency that always attends issues in clinical medicine.[20]

From faint whisperings in the late 1950s that gathered strength in the sixties and emerged in force in the seventies, bioethics has become an established presence in medicine. Very few American medical schools are without some program in ethics; Institutional Review Boards are an accepted feature of the research scene, and both patients and physicians are very conscious of patients' right to refuse treatment, of the need for informed consent, and increasingly, of the importance of the patients' participation in their own care. All of these changes have occurred *pari passu* with the expansion of the notion of person to include, as matters of public concern, interior sources of happiness, suffering, achievement, and even illness—things previously held to be private—and with the rise of a radical individualism as a political force.

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CONTRADICTIONS

Space permits only brief mention of the commercialism that has arisen over the same period during which the importance of the personal has permeated medicine. Both the shift to primarily monetary values, and the phenomenal increase in the number of malpractice suits and the size of their awards are having profound effects on medicine that are largely in directions away from a major concern with individual values and the importance of the relationship between doctors and patients. It is almost as if patients are asking for a medicine that is at once both intensively directed at their personal needs, desires, beliefs, concerns and fears, as well as being inexpensive, and sufficiently uniform so that fixed pricing for services makes sense. These are mutually incompatible goals. It may well be that the breakdown in authority and tradition that heralded the new directions of individualism also heralded other ruptures with the medical traditions which have held commercialism at bay during this century. Whatever their sources, these changes are in conflict right now, and the outcome is difficult to predict over the medium time—particularly in view of the political retrenchment and conservatism presently reigning. In the short view, nothing but turmoil seems apparent, while a farsighted look suggests the reemergence of the personal values that seem to have been coming to dominance in medicine and the society during this last half century.

THE PHYSICIAN AS PERSON

In the later years of his career, Walsh McDermott turned his attention to the individual development of physicians. (It is interesting to see the increased attention given to the individual development of student and physician in the prefaces and introductions to the Beeson-McDermott editions of the Cecil-Loeb *Textbook of Medicine*.) This direction in his work is a natural extension of his attention to what he called the Samaritan function of physicians in personal encounter medicine, and it seemed to stem in part from an effort to counter a recent public belief that the health status of a society has nothing to do with the work of individual physicians.[21] His interest in these issues was in advance of other academicians. As can be seen from previous paragraphs, however, concentration on the physician as a

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unique individual whose actions as an individual make a difference in the patient's care is directly derivative from the social trends of the era. After all, if the patient is a person, so is the physician. It was clear to Walsh that medical training—particularly in the postgraduate years—is strongly directed toward the moral development of physicians, not only the technical. This point has been well documented by Charles Bosk in his study of surgeons-in-training.[22] But while many have stressed the importance of the moral values implied in the relationship between physician and patient, McDermott appeared to be after those aspects of the behavior of individual physicians that would both undergird the scientific and technological tools of the modern physician, and be *teachable*. The difficulties involved in teaching virtue have engaged humankind since Hellenic Greece. Too often the problem is written off by saying that virtue is unteachable; students either have the propensity or they do not. But it has become apparent, once again, that the tools of modern medicine, with their enormous power, must be directed by human faculties whose guiding precepts in the use of the technology will be moral as much as technical. Wherever power is present, it is the case both that responsibility exists that may or may not be accepted and that it is as logically possible that the power be used for ill as for good. With this in mind, it seems inadequate to stop at the notion that virtue in medicine is unteachable. What is necessary, then, is some idea of what is to be included in the idea of the good physician that might provide a basis for the beginnings of systematic understanding and disciplined training.

WHAT DEFINES A GOOD PHYSICIAN?

McDermott believed that one could define a good physician as one who is trustworthy, and a trustworthy physician as one who has self-discipline.[23] Without wasting words he gets to the center of physicianship—trustworthiness and self-discipline. I believe that it is possible to build on this insight in a manner that both permits an increase in the efficacy of training in these regards, and provides a better basis for the evaluation of training programs.

Let me go back a step. The fact that good doctors are worthy of trust does not tell us why the care of the sick requires that trait. Doctors are persons who apply a specialized body of knowledge to

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the care of sick persons. The sicker the person is, the more accurate knowledge is absolutely necessary, and the more inadequate it often is. Both because of the inadequacies of knowledge, and because of the fact that knowledge cannot act on its own, sick persons require doctors. Even if, as is often the case these days, the sick have the knowledge they still require doctors, because of the nature of sickness.[24] Further, sickness always contains a threat to existence (real or imagined) and it is always filled with uncertainties which impede or even paralyze effective action.

Uncertainty is intolerable at all times but more so in the ill because their existence seems threatened, and yet they are required to make decisions about themselves. Unfortunately, as they perceive themselves to be increasingly endangered there is an increased urgency to act. But decisions and actions that are seen as having to do with one's very life require levels of certainty that are not available to the sick person—they simply do not have enough information, as does no one in such circumstances. Trust in others is one of the central human solutions to the paralysis of unbearable uncertainty. It is for these reasons that the sick put the kind of trust in doctors that they do.

Sick people, then, are people who are forced to trust. The better the doctor, the more trustworthy he is. But doctors are also faced with uncertainties and doctors are also threatened. Space does not permit a complete analysis of why whatever threatens the patient also threatens the doctor, but let physician readers remember their training days and how scared they always were that something untoward might happen to one of their patients. One important element of the threat to the doctor inherent in the patient's illness is the physician's responsibility for the patient. The doctor acquires the power to act on the patient's behalf because of the patient's trust. (In a complex society such as ours, cultural and legal factors have come to play a part in ensuring that the doctor is responsible, but these factors are derived, I believe, from the basic need of the sick person to trust the doctor.) Wherever power is present, there is always the communal demand for responsible action—power always implies responsibility.[25] It is true that the physician is not threatened unless responsibility is accepted. But society acknowledges the responsibility that physicians acquire because of their power by holding them accountable morally and legally in certain situations when they do not fulfill their responsibilities. The equation is complete. Doctors are

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people who, because of their special knowledge, are empowered to act by virtue of the trust given by patients, and who acquire responsibility thereby. As they act on behalf of the sick person, they are endangered by the possibility of failing their responsibility, and become threatened by what threatens the patient. Doctor and patient are bound in a reciprocal relationship—failure to understand that is failure to comprehend clinical medicine.

In the light of this understanding it is possible to examine trustworthiness and self-discipline. The sick person bestows trust on a doctor in the context of sickness, the practice of medicine and medical science. That is to say that patients always have at least social or cultural knowledge of medicine, and nowadays very much more than that. In these contexts, knowledge and competence are givens. That often-heard question, "Would you rather have a technically competent doctor or one who is humane?" is beside the point. A doctor without technical competence would be inadequate and unworthy of trust. The knowledge by itself cannot choose which patient it is to be used on and how. To be effective, physicians must be adept at working with patients—taking histories, establishing rapport, achieving compliance with regimens that may be extremely unpleasant, being sensitive to unspoken needs, providing empathetic support, communicating effectively, and even getting paid after the illness. Doctors who cannot do these things would not be adequate or entirely trustworthy.

THE RELATION BETWEEN TRUST AND ALTRUISM

Altruism, which seems important in physicians, is a concept that is muddied by the unfortunate history of the word. In the eighteenth century the idea was much debated in black or white terms: one was *either* altruistic *or* acted out of self-interest. Because many actions on behalf of others were seen to have an element of self-interest, altruism was denied. This all-or-none idea of altruism has, unhappily, been continued by the sociobiologists where the term is applied when an animal sacrifices itself for the continuation of the group. One would hope that sophistication about human behavior has increased enough in the last two hundred years so that we can be free to accept the idea that when humans act in behalf of others the central question is not whether they also gain, but what it means to act in behalf of another.

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In keeping with modern usage I am using the word altruism to denote actions on *behalf* of another.

It should be clear from the above that when a physician acts on the responsibility to care for a patient based on the sick person's trust, then altruism is implied. (Responsibility alone is not sufficient to demand altruism; a prison doctor may be responsible because of his duties, not because of the sick prisoner's trust.) It is quite clear that to act on behalf of another in medicine no longer means to act only on behalf of the other's *body*. The changes in the notions of person, of patienthood, and of the doctor-patient relation that have occurred over these last decades underline the fact that when the doctor acts for patients it is meant to be towards the goals that the patients would choose if they could act on their own. What patients believe to be in their own best interests may well require the active participation of the physician, but can almost never be known without the knowledgeable participation of the patient. Altruism in medicine requires more than knowledge of medical science, it requires also understanding illness—its causes, course, and outcome—from the patient's viewpoint, and then acting on the knowledge. It requires knowing about sick persons.

SELF-DISCIPLINE

It is obvious that what threatens the sick is their diseases. Pneumonia is dangerous, but generally responds to good care. Appendicitis is dangerous, but a relatively simple operation is curative. What gets in the way of good care for pneumonia or efficacious surgery for appendicitis is the *wrong* diagnosis. A diagnosis is not simply "pneumococcal pneumonia," or "appendicitis," but also must include appreciation of those factors—from the subcellular to the community—that underly the disease or affect the treatment. One wants to know whether the pneumonia is present because of underlying malignancy; or did the patient aspirate; is the host malnourished or otherwise compromised; will the patient follow the prescribed regimen? The question is not merely whether appendicitis is present, but is some hidden factor present that increases the risk of surgery? The proper diagnosis results, above all, from thoroughness; from examining the details, the dull, interminable details that are involved in the treatment of the sick. Clearly Walsh was correct that

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a trustworthy doctor is thorough and self-disciplined and that the "*deep belief in thoroughness is the most important element of medical education.*" (Emphasis in the original.)[26] It takes self-discipline to stay with the details. The internship is the place where the introduction to the details takes place. Alas, interns often believe that when they finish their internship the details will get relegated to someone else—it certainly appears that way in modern training programs where the resident has been elevated to the position of "advise and consent." But experienced physicians, when they are good, are good because of their mastery over the details as much as their mastery of medical knowledge. It should be no surprise that one of the signs of the waning power of a surgeon is the loss of patience with the tiny moment-by-moment details of the operation.

Self-discipline and trustworthiness are involved in more than control of the details. Constancy to the patient is necessary. It is not difficult to provide constant attention and maintained presence when things are going well. It requires self-discipline to maintain constancy when the case is going sour; when errors or failures have occurred; when the wrong diagnosis has been made; when the patient's personality or behavior are difficult or even repulsive; when impending death brings the danger of emotional closeness. When constancy is absent or falters too frequently, patients lose that new-found part of themselves—the doctor—that promised stability in the uncertain world of sickness.

With good reason much has been made of the need for physicians to maintain their knowledge through constant educational effort, because it is so evident that patients are threatened by physicians' ignorance. Good physicians admit their ignorance and call for help. It is true, but not self-evident, that over-referral is as bad as under-referral because it may reflect either pandering or fear. Recognizing that a constant accompaniment of medical practice is fear that damage will be done to a patient through one's actions leads to the next category. Patients are also endangered by failure of the physician's nerve. This is something that most laypersons are fortunate not to know about. Whether it is not overdiagnosing serious illness, starting or stopping treatment too soon, holding to a disputed diagnosis or course of action, or simply not turning and running when things get too bad, it takes nerve to care for the sick, and nerve requires self-discipline (both to be present and not to be converted to

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gun-slinging). When doctors get old, the thing that probably goes first is not knowledge but nerve. Psychiatrists see suicide looming in every depression; surgeons feel cancer in every lump of fat in a breast; internists suspect myocardial infarctions with every ache in a sterno-clavicular joint.

Self-discipline is necessary not only for thoroughness, but for the maintenance of knowledge, constancy to patients, and nerve—all components of the trustworthy doctor. When to these are added attributes of altruism and humaneness required to work with patients, it is obvious that technical competence is only the necessary beginning of a clinician. Perhaps in their best exemplification these virtues are unteachable. Perhaps in the same way it is not education that creates a Picasso. But just as even the unartistic can be taught to draw sufficiently to render a figure on paper, the basic attributes of these virtues are, I believe, both teachable and evaluable. Before someone denies the possibility, it seems reasonable to ask who tried to do the teaching, how much time and money, and how many people were committed to the task.

THE RETURN TO IDEALS

It does not require much observation to realize that these values are not central to the training programs of modern medical centers. But the history of the period of medicine through which Walsh McDermott lived his professional life suggests the strong beginnings of change. The great physicians of the 1920s embodied within themselves the ideals of their profession as they reached towards science to provide a solid intellectual basis for medicine. Individuality lost its warrant as science seemed to provide equality to all in the quest for nature's secrets and in the treatment of disease. Science became central to medicine and provided the values embodied in schools of medicine. In concert with the surrounding society, the importance of the individual person and of ethical issues have grown in medicine over the last decade. Once again the qualities of the individual physician have assumed importance, but they are now ineluctably married to science and technology. As so often throughout his career, McDermott saw this development sooner than most others and helped lay a systematic basis for a return to ideals of physicianship in medicine.

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David E. Rogers

Where Have We Been? Where Are We Going?

THE PRECEDING ESSAYS HAVE TRACED the evolution of modern medicine over the last fifty years through the eyes of a group of physicians and other health professionals linked, in part, through their association with Walsh McDermott and, in part, through their involvement in some of the changes that transpired in medicine. That personal care medicine underwent profound change during this era is abundantly evident. Although multiple forces were at play, the most powerful stimulus for change was the "interventionist" scientific revolution. Starting with the discovery of thyroxin in 1915, the definition of the cause and treatment of pernicious anemia in 1919, and Banning and Best's discovery of insulin in 1922, an increasing flow of scientific insights yielded more powerful therapeutic agents that, for the first time, gave the personal physician active power to alter the course of human disease. And these new technologies in turn dictated changes in how medicine was organized, taught, and practiced; the very nature of the discipline changed.

The importance to individuals of this scientific revolution was not lost on the American public. Serious federal funding of biomedical research began in the mid-1940s. In the ensuing years, the National Institutes of Health developed, an extensive private-sector biomedical science network grew up (and, in turn, built powerful academic health centers), full-time research-oriented physician-scientists emerged, and the number of full-time faculty in these academic centers rose rapidly.

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These developments in the science base of medicine led in turn to changes in medical education. As scientific evidence to prove or disprove the accuracy of diagnosis, the effectiveness of drugs or other treatments became available, autocratic professorial pronouncements became untenable; it became the nature of a doctor's evidence rather than his age or position in the medical hierarchy that counted. Further, because new technologies could readily be taught to others, younger physicians became swiftly knowledgeable, as Walsh McDermott noted in the last article before his death:

> It has been said that there is no substitute for experience, but, of course, there is. Yet I do not think it is sufficiently realized what an experience leveling instrument today's medical technology represents. Patients and young doctors formerly sought and paid great attention to old doctors—that is to say *certain* old doctors. This was not because of some Edwardian standard of courtesy, but because the experience of old doctors was of immediate and sometimes great value. . . . But . . . with today's drugs . . . [and] . . . the acquisition of knowledge through education, many of medicine's most important technologic gifts are now quite attainable by the young.[1]

How did these scientific accomplishments affect or change medical care or the health of Americans? What problems did the developments create? What are the forces now at play that will shape medicine of the future, and how will the profession change? This essay explores these questions.

First, the advances in our understanding of the physiologic and biochemical workings of the body and the cellular and subcellular elements of which it is comprised have been monumental. The interventions we can now make to alleviate human suffering, prolong life, or mute the ravages of disease have been much strengthened.

Second, and more recently, we have become more successful in bringing the fruits of that new biomedical knowledge to a wider range of Americans, including the poor. More people gained access to the medical care system shortly after World War II. However, the major effort to make medical care widely available came in the mid-1960s with the development of Medicare, Medicaid, and other related federal programs to finance medical care for the underprivileged in our society. Now that many of these inequities have been

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eliminated, the poor and those from minority groups see physicians as often as those who are well-off.

The dreadful violences done to humans in Nazi Germany, which surfaced after World War II, the horrors of the Nuremberg trials, and the development of the American Civil Rights movement also made medicine much more sensitive to the rights of individual patients, regardless of social class. Hospital ethics committees more rigorously defined what constituted informed consent, and what was and was not appropriate for one individual or one group to do to another. This led to a general improvement in the quality of care.

Lastly, during this period of advancing biomedical science and the delivery of its technologies to increasing numbers of people, Americans grew healthier. This century has seen remarkable improvements in American health, and those changes have come particularly rapidly during the past twenty years. Since 1965, age-adjusted death rates have fallen sharply—more swiftly than at any time during this century. Americans are now living longer than ever before. Although there are still wide gaps between death rates and longevity for those who are white and those who are not, progress has been achieved by all groups. We have witnessed a steady decrease in the incidence of death from eleven of the fifteen major killers of Americans, and the drop has continued uninterruptedly for twenty years. Infant and maternal mortality rates have fallen more speedily during the past two decades than ever before. And, at long last, some evidence is accumulating to suggest that modern medical care is in part responsible for these gains. Yet the advances have created problems.

First, and most preoccupying, is the problem of escalating costs of modern medical care. During the past two decades those costs have risen at rates almost twice that of the Consumer Price Index, and the rise has been steepest during the past decade; while the average hospital inpatient day cost $15.62 in 1950[2] and national expenditures were $12.7 billion,[3] the average cost per hospital inpatient day in 1984 was $409.85,[4] and the nation expended $387 billion—over 10 percent of its gross national product—on health and medical care.[5] Pressures to control costs now dominate the American political scene in the health sector.

Second, the flurry of new technologies put additional pressures on young physicians to specialize or subspecialize so that they could remain current in at least certain narrower sectors of medical

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progress. This circumscription of the kinds of problems a particular physician will manage, while understandable, was unplanned and unsupervised. Consequently, we are left without any rational system for delivering general medical services to the majority of Americans.

Third, the power of our technical interventions—most particularly the antimicrobials—has strikingly altered the kinds of disease that cripple or kill Americans. The acute, life-threatening infectious diseases of the past in which the issue of life or death was settled within a short period of time are rarely a problem nowadays. Replacing them are a series of chronic long-term illnesses like diabetes, crippling arthritis, coronary artery disease, or chronic pulmonary disease. These illnesses have become the main causes of human misery and loss of function and they require most of the physician's time and effort. In contrast to the simpler dramatic diseases of the past, management of these long-term illnesses is problematic; physicians often do not know when interventions are necessary or when patients can appropriately be left alone. Medical practice today often encourages the use of expensive technologies in situations of considerable uncertainty.

Fourth, one objective of the 1965 legislation, which was designed to bring medical care to all Americans, has not been realized. At the time of its passage, it was hoped that a single system of care could be established for all Americans. This aspiration has never been fully realized. Those treated in public clinics and hospitals' outpatient departments continue to receive care that differs significantly in its continuity and amenities from the care most Americans obtain from their private physicians. The technical quality of care delivered to the nation's poor may have been improved, but the continuity and human support that are considered important components of good medical care are still lacking in many settings. Whether we shall ever achieve the single-system of medical care viewed as so desirable twenty years ago now looks increasingly problematic. The costs of that care and the economic problems of the 1980s have caused many to rethink this large social objective.

The last unwanted accompaniment of our technologic progress has been the apparent loss of "caring"—by which we mean the compassionate, humanistic features of good doctor-patient interactions. Dr. McDermott called this the "samaritan" function of medicine:

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Medicine is deeply rooted in a number of sciences, but it is also deeply rooted in the samaritan tradition. Both science and samaritanism are directed toward the same goal—that of tempering the harshness of illness and disease. . . . When the only function of science was to provide a greater understanding of disease there was no problem . . . however, when the power to influence decisively human disease became the property of the personal service physician, it represented what was in effect a major technologic innovation.

This was the great watershed, for it placed science and samaritanism in opposition to each other in the same patient-physician encounter. Like a new steam engine, the technology required the development of a new institutional framework for its management and proper use. . . . To create some way of melding the two represented the profession's only option for adaptation to the impact of the new science. But such an adaptation was never really made, or rather the steps taken were made only in a faltering way. As a consequence, medicine, once a socially valued learned profession, has been unable to make a proper adaptation to the science-based rationalism of the 20th Century. In my judgment, the major lack is that it has not done a good job in fitting the samaritan function to the very different problems of today. Unless it can do so there is grave danger that medicine will continue to lose ground as an important healing social force extending well beyond simply its technology.[6]

Today, it is a common perception that, among recently trained physicians, this quality is in short supply; they are often viewed as cold, impersonal, or uncaring, too preoccupied with technology.

These, then, are some results of the changes in medical care in the last fifty years. What are the forces at play currently requiring the medical profession to adapt? While changes in medical care practice and education were profound in the first fifty years, they were evolutionary and proceeded at an acceptable pace; the shifts were reasonably comfortable for most. But at present, a whole series of forces promises to change medicine and medical practice much more swiftly. These now deserve serious consideration for they could make medicine more responsive to human needs, or conversely, less responsive, with unfortunate consequences for both physicians and society.

The major engine now driving change is the common perception that medical care is too expensive. Polls show that worries about costs now outweigh all others; problems like inequitable access to medical care, its quality, the continuing advance of biomedical science, or the training of new physicians, are now low on the public's

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list of priorities. It is concern about dollars that is prompting rapid and major alterations in how medical care is organized, financed, and delivered. This concern, along with an enormous national debt, a society grappling with major sociomedical problems like drug abuse, teenage pregnancy, or AIDS, and an aging population with mounting problems of chronic illness for which medicine has no final or curative answers, create wholly new problems for a health care system that cannot remain static.

Setting aside the role that advancing medical science will play, several compelling forces are now emerging which will have a major impact on health-care institutions, on how physicians will deliver care to their patients. We may expect to see:

(1) changes in the way hospitals and physicians are paid;
(2) a growing surplus of hospital beds;
(3) a probable surplus of physicians;
(4) the development of new technologies that will permit the treatment of many more serious illnesses on an out-of-hospital basis;
(5) a rapid increase in both the number and variety of ambulatory care centers;
(6) growing competition from for-profit health enterprises and chains;
(7) increasing problems in financing and providing medical care for the poor;
(8) diminishing national support for research and development by nonprofit institutions in certain areas critical for future improvements in health care;
(9) changes in demography and social mores creating different, more complex medical problems.

Each of these possibilities calls for additional explanations.

1. *Changes in the Way Hospitals and Physicians are Paid*

Today, only about one-third of our health-care expenditures are paid directly out-of-pocket. The remaining two-thirds are paid by private health insurance companies and government health-care programs such as Medicaid and Medicare. Historically, health insurance programs have accepted the central role of the physician. They have separated his or her payment from that of the hospital. Insurance has, in the main, paid hospitals for their costs. Many of these costs are

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incurred because of procedures and interventions prescribed by physicians, but the physician has been left largely alone. However, because of the troubled economic times, insurers—public and private—are, for the first time, beginning to question seriously the physician's judgment and to look over his or her shoulder to determine what they, as payors, might regard as excessive or unnecessary hospital or medical care expenditures. Insurers are establishing more specific rules for what they will pay for, and in which health-care settings. The recent passage of amendments to the Social Security Act, the hospital rate-setting laws, and the establishment of rate-setting commissions in nine states, are changing reimbursement for the nation's hospitals to predetermined payments based on *diagnosis* rather than for services or procedures on a *cost* basis.

Clearly, this new reimbursement system will alter the ground rules under which hospital and medical care is rendered profoundly. For the first time, hospitals will be forced to compete with each other on the basis of *price,* and this, in turn, will affect physicians' behavior. There will be a rapid growth of plans in which hospitals and physicians receive a flat yearly capitation rate per patient. At first glance, such plans contain major financial incentives for both the doctor and the patient to avoid hospital admission and to make more conservative and restrained use of new technologies. But these insurance payment changes mean that hospitals and doctors will increasingly be engaged in price competition for patients. In addition, third-party payors will be making independent judgments about the medical need, the appropriateness of physician services, and, most particularly, about inpatient hospital care.

2. *A Growing Surplus of Hospital Beds*

In the past fifty years, hospitals have become the core institutional providers of health care in the United States. The new technologies that could be applied for the benefit of the sick dictated this change. Yet, as hospital costs have continued to rise steeply, taxpayers and private insurance have become less willing to absorb increases. Hospitals are, therefore, becoming more and more vulnerable to competition from less expensive and more convenient modes of providing health care. Much like urban department stores, which now face major competition from alternative retailing operations such as discount houses, direct mail, and specialty shops, hospitals

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will, in the future, face competitive threats from alternative approaches. These will include health maintenance organizations, ambulatory surgical centers, urgee centers (freestanding centers offering emergency care), primary care centers, freestanding diagnostic centers, skilled nursing homes, hospices, and, ironically, their own medical staffs. Most of these newer forms of health care will replace inpatient with outpatient care, which is both cheaper and more convenient for patients.

For all of these reasons, the hospital heyday is probably over. For forty years, admissions to hospitals have been rising faster than overall population growth. But independent forecasts now suggest an absolute decline in the number of hospital admissions over the next decade. While community hospital inpatient days increased approximately 30 percent from 1965 to 1975, the rise has slowed sharply to only a 3 percent increase in the last five years. And this has occurred *despite* a rise of approximately 2.5 million in the number of elderly during the same period.

The typical American is also spending fewer days in the hospital now than five years ago. Declines are sharpest for the two largest age groups in our population—those under fifteen and those between fifteen and forty-four. During the last eight years, rates of hospital use for those under fifteen have declined by almost 10 percent, and for those fifteen to forty-four, by 7 percent.

It therefore seems likely that hospitals will be caught in a troublesome squeeze. The decline in demand for beds will have a significant impact on our community hospitals. Many, which have incurred substantial debts for new or renovated facilities, will find their inpatient populations falling while, at the same time, insurers will be paying them less for each case admitted. This is very likely to spur aggressive efforts by many hospitals to develop special relationships with the new kinds of out-of-hospital health-care programs described, and with private physicians, to help guarantee admissions to their particular hospitals.

3. A Probable Surplus of Physicians

Although there have been arguments about the methodologies employed in the final report of the Graduate Medical Education National Advisory Committee—the GMENAC Report—most now accept its thrust that we are overproducing doctors.[7] The report

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estimates that, by 1990, the nation will have approximately 33 percent more physicians than in 1978 and almost 80 percent more than in 1970. These figures suggest that the nation will have approximately 70,000 more physicians than will be needed in 1990. While the fit between projected supply and projected need varied considerably according to the specialty—with persistent shortages predicted in psychiatry, emergency medicine, preventive medicine, and public health—most of the surgical and medical subspecialties are projected to produce nearly double the number of specialists needed by 1990. This surplus of physicians is going to occur at a time when hospital admissions will be falling, with the result that, by the mid-1990s, there may be as many as one-quarter to one-third fewer patients hospitalized for every active physician. Since the average doctor earns about half his income from hospital practice, this will have an enormous impact on both the financial condition and attitudes of doctors, particularly on recent graduates who will emerge from training with greater debts than ever before.

These realities may change the character of the practice of medicine sharply, creating both new challenges and opportunities for physicians as they seek patients, and new practice arrangements that rely less on the use of the hospital as a site of care.

4. The Development of New Technologies That Permit the Treatment of More Serious Illnesses on an Outpatient Basis

There is much to suggest that the next decade will also see advances in medical technology that will have a profound impact on health-care delivery by reducing the need to hospitalize a number of today's patients. New diagnostic imaging technologies, less invasive therapeutic technologies, new drugs, improved home-care services, and other similar developments will accelerate the flight from the hospital.

5. A Rapid Increase in Ambulatory Care Centers

Experts are now projecting a five- to ten-fold increase in the number of freestanding ambulatory care centers during the next decade. These will not just be in primary care centers, which have grown apace in recent years. Many will be highly specialized urgee centers, surgee centers, renal dialysis units, or emergency centers. The most significant impact of more ambulatory forms of treatment will

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probably be in the area of surgery. Surgical treatment is currently the core of a hospital's inpatient volume. Surgical procedures represent approximately 43 percent of the average community hospital's inpatient days. The growth of freestanding ambulatory surgical centers, or day surgery programs which do all minor surgery (surgee centers), will pose an additional threat to hospitals. They will also place those institutions in competition with their own medical staffs for patients.

A recent study has suggested that as many as 40 percent of all surgical procedures can be performed safely on an outpatient basis without either pre- or postoperative hospitalization.[8] While the result of such a change would be significant savings to the patient or the insurer, the hospital is certain to suffer significant losses.

6. Growing Competition from For-Profit Enterprises and Chains

In recent years, a great deal of attention has been focused on the rapid growth of proprietary hospital chains in the United States and on its implications for the health-care field. Today, they represent only a small share of the nation's community hospital capacity—about 12 percent of hospitals and 10 percent of beds. While they are not likely to become the dominant mode of hospital ownership within this century, they do represent a rapidly growing and significant new force.

Over the next decade, the real growth in proprietary chain institutions, and the area where they may become predominant providers of care, is likely to be in the provision of alternatives to inpatient hospital care. Here, they will be competing actively with nonprofit hospitals and volunteer community organizations in establishing a variety of nonhospital health-care arrangements. Physicians and nonprofit hospitals in particular will be seeking to enter these same activities as a way to encourage additional referrals, earn a profit to subsidize free care at their institutions, cover their educational costs, while at the same time providing essential community services.

The groups most threatened by the for-profit developments will probably be low- and moderate-income patients. Today, most health insurance provides good coverage against the costs of inpatient care, but much more limited coverage for out-of-hospital activities. Thus, many low-income families may have difficulties in paying the full—

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though lower—costs of alternative out-of-hospital services. This economic reality is likely to lead both proprietary chains and nonprofit hospitals to seek more income by establishing those new services in only the most affluent communities, leaving "someone else" to deal with the less fortunate.

7. Increasing Problems in Financing and Providing Care for the Poor

This problem logically follows from the above. The probability of continuing high rates of unemployment, reduced public support for health programs for the poor, and a persistently high proportion of people in poverty will create serious problems for the nation's health-care system. As price competition between hospitals grows more intense, it seems probable that many voluntary hospitals will be forced to abandon their "free-care" role. This free care has often been provided by cost subsidies derived essentially from payments made by more affluent patients. However, as insurers begin to negotiate reimbursement based on *price,* free-care support will become much more difficult to sustain. We need to pay attention to this trend through the 1980s. Today's situation, which finds almost half the poor and near poor without adequate health insurance, is likely to continue; indeed, the number of poorer citizens may actually grow.

8. Diminishing National Support for Research and Development by Nonprofit Institutions in Certain Areas Critical for Future Improvements in Health Care

In recent years, national support for new program development or experimentation with new delivery systems in areas of child health, maternal services, mental health, alcohol or drug abuse, family planning, and emergency health services have all been cut. The move away from government support in some of these vital areas raises serious questions about how new approaches and new ways of delivering care can be developed, and the worry that many of these fields could remain in their current state of limited knowledge for the remainder of the century, if the present curtailments in funding are maintained.

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9. Changes in Demography and Social Mores Creating Different and More Complex Medical Problems

The "sophistication" of a society can be told, in part, by scanning its disease patterns. If the so-called "pneumonia-diarrhea complex," which dominates the medical scene in most primitive societies, taking a huge toll in life among the very young, is typical there, in the developed Western world, diseases of older people—heart disease, cancer, stroke, diabetes, and arthritis—occupy the time of the majority of medical professionals, consuming most of the medical resources.

A rapid demographic shift—the aging of American society—will create increasing challenges for medicine very soon. At the start of the twentieth century there were 75 million Americans; only one in twenty-five was over sixty-five. In 1980, there were 225 million Americans; one in nine was over sixty-five. By the year 2000 it is estimated that almost one in seven, or 36 million, Americans will be over sixty-five. It is sobering to recognize that, since the beginning of time, half of all those who have survived to sixty-five are alive today, and that the number of Americans seventy-five and over is increasing at a rate that exceeds the population growth in India! This group of elderly, with their much heavier burdens of acute and chronic disease, will sorely tax medical care, almost certainly diverting resources from the care of the young.

Other problems, created by changes in urban life, culture, and social mores need also to be considered. The mounting problems of America's inner cities, with their racial ghettos, high rates of joblessness and climate of anger, fear, and hopelessness, need no elaboration here. Changes in social and sexual behavior are also well-known. These changes create new medical problems—problems that originate in social behavior, but result in medical illnesses. Suicides, homicides, and injuries sustained through violence loom large in medicine today. So, also, do many illnesses related to drug and substance abuse. The nation is also faced with a veritable epidemic of teenage pregnancies, now exceeding one million a year; with it come many low birthweight infants, worrisome infant mortality rates, and a high incidence of child abuse. Perhaps most dramatic at this time is the relentless increase in cases of Acquired Immune Deficiency

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Syndrome (AIDS), which could assume epidemic proportions in the not-too-distant future. This is largely a disease of life-style, produced by a tough and sophisticated virus. Although it seems probable that new drugs and vaccines will at some future date bring it under control, it is equally clear that AIDS will cause many deaths, and incite fear bordering on panic. Profound behavioral changes will be required before it is tamed. In the interim, AIDS will consume the time and talents of many research scientists, and much money, and medical care resources will be diverted to care for those stricken with this "disease of social change."

WHAT OF THE FUTURE?

As with any major transformation in American life, certain of the forces discussed in this essay could work to improve conditions, both for patients and for health professionals. A more competitive, less hospital-oriented medical system, with many more physicians, may lead to more accessible higher-quality, and less costly health services. On the other hand, these profound changes could also lead to misfires, which both society and the health professions would do well to consider in planning that future. Thus, for example:

—Will the new rapidly growing competitive alternatives to hospital care be made available to all communities or just to upper-income areas?

—Will price competition between hospitals leave some patients needing critical or complex life-saving care to be handled in less skilled and less appropriate ambulatory institutions for economic reasons? Who will decide who needs inpatient versus outpatient care, and who will be responsible for blowing the whistle on possible abuses?

—If there is indeed to be a surplus of hospital beds and physicians, will the more competitive system lead to health-care costs being reduced, or will these surpluses paradoxically escalate costs as physicians and institutions provide unnecessary health services to patients as a way of sustaining their own financial well-being?

—If out-of-hospital care is the wave of the future, what will be done with our current educational system of clinical training for young physicians, which is so heavily hospital focused?

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—If these changes are to occur, who will treat the poor, or patients with multiple health and social problems? Will institutions focusing on these groups disappear because they are noncompetitive?

—If support for basic biomedical research is significantly curtailed, will we be left with expensive "half-way technologies" rather than more effective ways of managing human illness?

—Will care of increasing numbers of elderly, together with medical problems created by changes in society, overwhelm our system of medical care, erasing the gains of the last two decades?

These are all uncertainties. What, then, can be safely predicted? An increasing trend toward out-of-hospital care, together with the development of large fully integrated systems of care in which the hospital plays an important, but no longer a dominating, central role. Also, pressures stemming from an increased supply of physicians will probably encourage younger members of the professions to establish practices in many areas traditionally considered undesirable, though probably not in very low-income areas, unless the ground rules for physician reimbursement are changed. Those same pressures may encourage more physicians into specialty areas such as public health, geriatrics, or occupational medicine, which until recently were seen as less attractive. Similarly, they will propel young physicians into group types of medical practice arrangements in HMOs, salaried practices, or new health-care conglomerates. More physicians will probably opt for practices in smaller towns, and some movement in this direction is already occurring. A recent survey has shown that physician specialists are now, for the first time, locating their practices in towns of smaller size.[9] These are potentially positive changes.

It also follows from what has been projected that the solo, entrepreneurial practice of medicine will become rare—almost a vanishing choice for young physicians. As the application of new technologies has become more complex, the cooperation of a number of health professionals is essential to the delivery of adequate care.

The increasing number of physicians and the rising competition between them may have two other effects that need consideration. The first is one of escalating confrontations between older established physicians and younger ones who are just entering practices. As the supply of physicians expands, those already in place may seek to put barriers in the paths of those who are not. By 1990, approximately

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40 percent of all practicing physicians will have entered practice since 1978. But many may find no room at the inn—geographically, on hospitals' staffs, in surgical facilities. Two recent surveys have shown that, on the average, physicians' incomes actually declined during the 1970s. Most of this decline was probably borne by young graduates, and there may be increasing disparities in the incomes of different generations of physicians. That could create intergenerational tensions of a kind that would accelerate yet another trend—the increasing corporatization and commercialization of medicine.

Here, we run the hazard of developing two kinds of physicians, with quite different outlooks and values. We may see the emergence of entrepreneurial groups of physicians who will regard the practice of medicine as a proper and profitable business enterprise. They will hold a personal financial stake in their own medical enterprises, developing and emphasizing services and high technologies that are profitable, eliminating those that are not. The bottom line for them will be income, and financial growth.

Physicians with more socially oriented goals and values may take a similarly "corporate" route, but one that goes in another direction. Because the development of new practices will be expensive, the competition for patients intense, the chances of failure high, and the debts from medical training heavy, these physicians may opt to join institutions with quite different objectives, sacrificing their independence for security and predictable hours, and for social goals more compatible with their own. These young physicians may become the salaried employees of HMOs, groups, public hospitals, or clinics that are working to make more restrained and discriminating use of technology, personnel, and social support systems. These institutions, seeking to lessen the cost and broaden the impact of medical services, may be concerned more with the care of the poor and the greater burdens of their sociomedical needs.

Physicians, so divided, may find less in common with each other. The hazards to the medical profession, to patients, and to society more generally from such developments seem very real.

And what of America's health centers? During the period we have been examining they became the home for the world's largest and most sophisticated biomedical research enterprises. They have served also as major regional referral centers to provide complex tertiary care. They have been a major resource for the care of the urban poor,

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particularly for those with serious medical problems. They educate most of America's physicians and many other health professionals in medical science, providing the clinical skills and the human values needed to help the sick. Some of the circumstances recounted here are creating very serious problems for them. How will these institutions adapt to some of these realities?

First, in the short term, a number of academic medical centers may become smaller. It seems likely that there will be a progressive shrinkage in many basic-science departments. Clinical faculties may, however, expand, and their members will often be recruited because of their ability to attract patients with problems that promise high fees and good hospital reimbursement.

Second, it seems probable that the biomedical research capacity of a number of medical centers will decline, at least in the near future. Contemporary evidence suggests that the nation may be unwilling to pay the full costs of all the research now under way; among academic centers, the rich may become richer, the poor poorer. Perhaps twenty to thirty major centers will be able to continue or even expand their biomedical research capabilities. Others, however, will not.

Third, if current trends continue, there may be a progressive decline in the enrollment at medical schools of young persons who are poor, black, or Hispanic, and the number of applications to medical schools from persons from such backgrounds may continue to fall.

Fourth, the hospital segment of academic centers may become less socially relevant. In an effort to survive, these centers may be forced to care for fewer poor people, eliminate services that produce deficits, and expand services that pay well. Services such as home health care, family planning, alcohol and drug abuse, rehabilitation, and organized outpatient departments, which all incur losses, may be curtailed; high technology services, which generate respectable revenues, may at the same time expand.

Lastly, in an effort to stay solvent, academic centers may create or spin off potential profit-making enterprises, establishing satellite clinics or affiliations with smaller hospitals to ensure an adequate flow of patients. They may enter arrangements with all kinds of health-delivery systems, offering inducements to bring practicing physicians into their fold. They may become involved with profit-making activities: garages, apartment houses, shopping centers,

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health spas. While these may not seem very attractive possibilities to those who grew up in medicine during the period we have described, many academic health centers may choose to explore such involvements to remain financially solvent.

But what of the longer view? I believe Walsh McDermott would have identified a similar if not identical set of forces shaping medicine of the future. He would have agreed that medicine of tomorrow would be quite different from today. But as an undauntable optimist, I believe he would have predicted that medicine's powerful healing role—both social and technological—would continue to grow, indeed that medicine and medical science would assume increasing social importance in that future. I agree. Further, I would point out the fact that futuristic predictions tend to be too gloomy because they do not take into account the creativity or basic decency of human beings. History suggests that societies, when faced with trends that look as though they will create negative human consequences, often opt for changes of a more socially responsible nature to avoid such outcomes. Thus people often make adjustments in trends that futurologists find quite impossible to predict. What final projections would I be prepared to hazard?

First, I would suggest that, within the decade, all of the organizational, structural, and governmental changes in medicine now underway will be successful in bringing medical care costs under control—or at least reducing their rate of increase to levels that will be considered acceptable by most Americans. As this takes place, I believe public priorities will once again shift to those areas where medicine plays its most effective role. Thus, national concerns will return to promoting more and better biomedical science, developing more efficient methods of bringing modern medical health care to all Americans, and improving the quality of that care.

Second, as costs come under control, I believe that the practice of medicine will become somewhat less economically attractive than it is at present; that this will lead the profession to attract once again more young men and women whose fundamental interests are predominantly both social and scientific; that their primary goals will be to care for sick people, and to use new biologic science to further unravel some of the mysteries of life. Despite some of the forces operative today, medicine continues to attract some of our most idealistic and capable young men and women. While economic

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problems, increasing tuitions, and the underrepresentation of minorities in medicine are a present concern, there are many more women, more blacks, more Hispanics, and more from less fortunate socioeconomic backgrounds entering medicine now than in decades past. These new physicians, who come from much more varied backgrounds than before, should be better equipped to adapt to the changing needs of medicine and the larger society than those who preceded them.

Third, I believe that the organizational revolution—the striking changes in how medicine is practiced and its increasingly competitive nature—will lead it to become once again much more responsive to the needs and wishes of patients. A more competitive system will prompt more careful attention to increasingly well-informed patients, and this should soften some of the harshness of technologically oriented medicine. Further, with the patient again the central figure in the whole complex business of medicine, the role of the generalist physician will be reestablished, but in a different form. I will guess that this role will often be subsumed by a carefully orchestrated team of subspecialists who all know the patient and can effectively meet all of his or her medical needs on a one-stop basis. Walsh McDermott was convinced that this could only be achieved if physicians or groups of physicians assumed responsibilities for defined population groups. The steady growth in prepaid arrangements for defined groups suggests that this will indeed come to pass.

I am also convinced that with such changes in physicians' responsibilities—that of having long-term continuous responsibilities for *all* their patients—will broaden doctors' perceptions of what they will regard as their appropriate and unique medical province. Medicine of the 1980s has learned to manage the biological or biochemical abnormalities of disease with remarkable effectiveness. But even today, the best physicians move beyond those parameters to consider more fully the physical, mental, and social impacts of illness. Doctors are beginning to pay more attention to long-term functional outcomes. Thus, in 1986, thoughtful physicians are no longer satisfied with just the biological results of medical or surgical management of a disease problem. They want good lasting functional results as well. As a simple example, a patient discharged after postmyocardial infarction with good cardiac function and no angina, who still perceives himself to be a cripple, unable to work six months later,

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is now considered by many physicians to have been medically mismanaged.

Fourth, I will project that medical education will turn more attention to the humanistic, caring, compassionate skills, which are so critical to the therapeutic potential and capacity of the fully-informed physician. I am pleased with the increasing focus on developing and refining these skills now in evidence in many of the nation's medical schools. Walsh McDermott was also convinced that developing this facet of medical care was an unequivocal responsibility of physicians—not of others.

> While we can obtain highly useful insights from imaginative writers of fiction, from hopefully objective social scientists, and from the frustrating experiences of our nonmedical friends, these are not, in my judgment, the people to analyze and attempt to teach the samaritan function to medical students or residents. My principal reason for making this statement is the conviction that in today's world it is the explanation, interpretation, and justification of the technology as it is related to the ups and downs of human function that is the essence of the physician's act. This cannot be done by anyone other than the physician.[10]

Last and perhaps most exciting, offering the greatest hopes for the future welfare of society is the remarkable potential of new biological science. The spectacular advances in molecular biology, genetic engineering, immunology, transplantation, and in many other sectors of modern biology offer enormous promise for improving medicine and therapy and the management of human disease and illness in the future. There is much to suggest that powerful new knowledge allowing more effective and less expensive interventions is coming along at increasing rates. Clearly, finding effective ways to stop the ungovernable growth of cells that we call cancer, or to prevent the sludging of arteries that we call atherosclerosis will improve the human condition as dramatically as did the advent of the antimicrobials.

I do not believe that these improvements in medicine, which will prevent or delay death, will lead to an increasing number of enfeebled, mindless oldsters. Many of these advances should postpone chronic illness and extend adult vigor further into what is generally agreed to be our fixed life span. I am taken by the thesis advanced by Dr. James Fries and his colleagues suggesting that the average period

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of diminished physical vigor will decrease in the future, that chronic disease will occupy a smaller proportion of a typical life span, and that the need for medical care in later life will be reduced.[11] Increasing attention to good biomedical science, to social interactions that promote health, and a considerable focus on maintaining the independence and autonomy of older people should postpone many of the phenomena commonly, but often incorrectly, assumed to be inevitably associated with aging. If this reasoning is correct, we can hope for advances that will permit life to be physically, emotionally, and intellectually vigorous until shortly before its close. The Fries thesis that, like the one-horse shay, death will then come swiftly and inevitably has considerable appeal to me.

As is apparent, I am of the belief that medicine will remain a powerful force for good in our society, though it may, in the next decade, occasionally stray from its more lofty objectives to a preoccupation with the less important or more trivial, and undergo periods of travail. Clearly, medicine must strive to reestablish the kind of physician-patient relationship so important in care which worries many nowadays. Our technologies, so powerful and so miraculous, have introduced an unfortunate emotional moat between doctor and patient, which medicine needs to bridge more effectively. Society also needs new and unequivocal evidence that the physician's concerns are for them, not the professions' self-interests. Clearly, physicians have been given their special place in society primarily because the public believes that the profession has a commitment to put the needs of individual patients and the public ahead of any personal gains. This needs reaffirmation.

We are capable of bringing good quality medical care to all Americans. There is much to suggest that its sensible application can be achieved at a price that our society can afford. Although medicine alone cannot solve many of the health problems created by the contrariness of man, it can be an ever more important force in tempering some of the harsher miseries of life in our society.

The period of medicine spanned by Walsh McDermott's career was one of accelerated change. Those fast changes will certainly continue during the next half century. Harnessing the remarkable advancing technologies with socially appropriate methods for their delivery to those who need them, remains the continuing challenge

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for physicians and all who work in the field of health and medical care.

ENDNOTES

[1]Walsh McDermott and David E. Rogers, "Technology's Consort," *The American Journal of Medicine,* 74, (March 1983), p. 356.
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Notes on Contributors

Paul B. Beeson, born in 1908 in Livingston, Montana, is professor of medicine emeritus at the University of Washington. Former chairman of the Departments of Medicine at Emory University and Yale University and Nuffield Professor of Medicine at Oxford, he was the co-editor with Walsh McDermott of the *Cecil Textbook of Medicine* from 1963 until 1979.

Robert J. Blendon, born in 1942 in Philadelphia, Pennsylvania, is senior vice-president of The Robert Wood Johnson Foundation. His work on Medicaid, private giving in health care, medicine in China, and public opinion and health-care costs has been published extensively.

Eric J. Cassell, born in 1928 in New York City, is clinical professor of public health at Cornell University Medical College and attending physician at the New York Hospital–Cornell Medical Center. He has written extensively on the epistemology of air pollution and is the author of numerous articles on medical ethics, the care of the dying, and the theory of clinical medicine.

Leighton E. Cluff, born in 1923 in Salt Lake City, Utah, is executive vice-president of The Robert Wood Johnson Foundation, adjunct professor of the Department of Medicine at the University of Pennsylvania, and clinical professor in medicine at the University of Medicine and Dentistry of New Jersey–Rutgers Medical School. Author of numerous articles on internal medicine, he recently co-edited with Joseph E. Johnson III the *Clinical Concepts of Medicine Monograph Series.*

Kurt W. Deuschle, born in 1923 in Kongen, Germany, is Ethel H. Wise Professor of Community Medicine and chairman of the department at Mount Sinai School of Medicine. He was Chief of Tuberculosis at the Navajo Medical Center from 1952–1954, and director of the Navajo-Cornell Field Health Research Project from 1955–1960. He has written extensively on the treatment of tuberculosis and pulmonary diseases, particularly in cross-cultural medicine.

Robert J. Ebert, born in 1914 in Minneapolis, Minnesota, is special advisor to the president at The Robert Wood Johnson Foundation. He was dean

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of Harvard Medical School from 1965–1977 and Caroline Shields Walker Professor of Medicine Emeritus at Harvard University. He is the author of many studies of inflammation and numerous essays on medical education.

Kenneth G. Johnson, born in 1925 in New York City, is adjunct professor of community medicine at the Mount Sinai School of Medicine and a senior program consultant of The Robert Wood Johnson Foundation. He is author of numerous studies on the effects of human radiation, the epidemiology of chronic diseases, primary health care, and the evaluation of health systems.

Edwin D. Kilbourne, born in 1920 in Buffalo, New York, is distinguished service professor and former chairman of microbiology at the Mount Sinai School of Medicine. He has held positions in departments of medicine and public health, and has been co-author and editor of several books on preventive medicine and public health. His research has been in the field of animal virology, with special reference to the genetics of influenza virus and new approaches to vaccination against influenza.

Robert G. Petersdorf, born in 1926 in Berlin, Germany, is vice-chancellor for the health sciences and dean of the School of Medicine at the University of California, San Diego. A member of the Institute of Medicine of the National Academy of Sciences and a former president of the American College of Physicians, he is editor of Harrison's *Principles of Internal Medicine.*

David E. Rogers, born in 1926 in New York City, is president of The Robert Wood Johnson Foundation, adjunct professor of medicine at Cornell University Medical College, and clinical professor of medicine at Rutgers Medical School. Editor of the *Year Book of Medicine* since 1966, Dr. Rogers has written extensively on infectious diseases and the role of foundations in health care.

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